



BCUA CSO Group

Bergen County Utilities Authority (NJ0020028)

Borough of Fort Lee (NJ 0034517)

City of Hackensack (NJ0108766)

Village of Ridgefield Park (NJ0109118)

Public Participation Program Report

June 27, 2018



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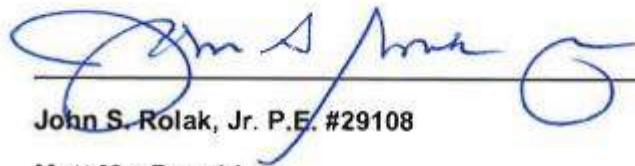
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1 Certifications

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for purposely, knowingly, recklessly, or negligently submitting false information."

Title: BCUA CSO Group Public Participation Program Report

Preparer:



John S. Rolak, Jr. P.E. #29108

Mott MacDonald
111 Wood Avenue South
Iselin, New Jersey 08830-4112

6/25/18

Date

June 2018

Public Participation Report for the BCUA CSO Group

Submitted on behalf of the following participating Permittee by
Bergen County Utilities Authority on behalf of the BCUA CSO Group

NJPDES Number NJ0020028 (Bergen County Utilities Authority)

Approval of Report:

Permittee:


Robert E. Laux
Executive Director, Bergen County Utilities Authority


Date

NJPDES

Certification:

"Without prejudice to any objections timely made to permit conditions, I certify under penalty of law that this document and all attachments were prepared as part of a cooperation performed by members of the BCUA CSO group effort in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information. Based on my inquiry of the person or persons who reviewed this report, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for purposely, knowingly, recklessly, or negligently submitting false information."

Permittee:


Robert E. Laux
Executive Director, Bergen County Utilities Authority


Date

June 2018

Public Participation Report for the BCUA CSO Group

Submitted on behalf of the following participating Permittee by
Bergen County Utilities Authority on behalf of the BCUA CSO Group

NJPDES Number NJ0034517 (Borough of Fort Lee)

Approval of Report:

Permittee:  
Alfred R. Restaino, Borough Administrator Date

NJPDES Certification:

"Without prejudice to any objections timely made to permit conditions, I certify under penalty of law that this document and all attachments were prepared as part of a cooperation performed by members of the BCUA CSO group effort in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information. Based on my inquiry of the person or persons who reviewed this report, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for purposely, knowingly, recklessly, or negligently submitting false information."

Permittee:  
Alfred R. Restaino, Borough Administrator Date

June 2018


Public Participation Report for the BCUA CSO Group

Submitted on behalf of the following participating Permittee by Bergen County Utilities
Authority on behalf of the BCUA CSO Group

NJPDES Number NJ0108766 (City of Hackensack)

Approval of Report:

Permittee:



Wayne Vriesema
Project Manager, City of Hackensack


Date

NJPDES Certification:

"Without prejudice to any objections timely made to permit conditions, I certify under penalty of law that this document and all attachments were prepared as part of a cooperation performed by members of the BCUA CSO group effort in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information. Based on my inquiry of the person or persons who reviewed this report, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for purposely, knowingly, recklessly, or negligently submitting false information."

Permittee:


Wayne Vriesema
Project Manager, City of Hackensack


Date

June 2018

**CSO Supplemental Team Public Participation Report
for the Village of Ridgefield Park**

Submitted for NJPDES Number NJ0109118 (Village of Ridgefield Park)

Approval of Report:

Permittee: Alan O'Grady 6/5/18
Alan O'Grady Date

NJPDES Certification:

"Without prejudice to any objections timely made to permit conditions, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for purposely, knowingly, recklessly, or negligently submitting false information."

Permittee: Alan O'Grady 6/5/18
Alan O'Grady Date

2 Introduction

The Bergen County Utilities Authority (BCUA) currently owns and operates the Water Pollution Control Facility (WPCF) located in Little Ferry and provides wastewater transportation and treatment services for forty-seven (47) municipalities, serving a population of about 565,000 people. The BCUA services municipalities that are primarily located in the Hackensack River and Overpeck Creek drainage areas and provides wastewater treatment and transportation services to three (3) municipalities with combined sewer systems, and which have combined sewer overflow (CSO) outfalls including the Borough of Fort Lee, the City of Hackensack, and the Village of Ridgefield Park.

The New Jersey Department of Environmental Protection issued New Jersey Pollutant Discharge Elimination Permits (NJPDES) to all municipalities/authorities that own or operate combined sewer systems and authorities that provide wastewater transport and/or treatment services to municipalities with combined sewer systems. The BCUA owns and operates the trunk/intercepting sewer systems that transport flows to the WPCF, including wastewater flows from combined sewer systems. The collection and conveyance of wastewater (both dry and wet weather) from municipal combined sewer systems into the BCUA Trunk Sewer, including the CSO discharge pipes, are owned and operated by the individual municipalities. These facilities are permitted under Individual NJPDES Permits provided to the BCUA and each combined sewer municipality with an effective date of July 1, 2015 as follows:

- Bergen County Utilities Authority (BCUA) – NJPDES Permit No. 0020028
- Borough of Fort Lee – NJPDES Permit No. 0034517
- City of Hackensack – NJPDES Permit No. 0108766
- Village of Ridgefield Park – NJPDES Permit No. 0109118

The above permits required that the individual permittees undertake the development of numerous reports and the establishment of a CSO Supplemental (Advisory) Team made up of impacted members of the service district. The permit provided the option for these efforts to be undertaken individually or on a regional basis for all hydraulically connected municipalities to the BCUA. The BCUA, Fort Lee, Hackensack, and Ridgefield Park have agreed to complete work independently, but to undertake the coordination of a Regional approach to the reports and the establishment of the CSO Supplemental Team. This coordination effort is being guided by BCUA. Tasks that are being undertaken, and paid for jointly, is being completed under a shared services agreement known as the BCUA CSO Group and is being completed by Mott MacDonald. The BCUA CSO Group is made up of all four individual permittees within the District (BCUA, Fort Lee, Hackensack, and Ridgefield Park).

As noted above, while the members of the BCUA CSO Group have agreed to complete a Regional Sewer System Characterization Study and CSO LTCP most of the work will be completed separately and then coordinated and integrated through group meetings into a regional submission through the BCUA. Three different consultants were engaged in the development of Regional Reports. The Borough of Fort Lee retained HDR to complete its individual Reports, the City of Hackensack retained Arcadis to complete its

individual Reports, while the Village of Ridgefield Park and BCUA both retained Mott MacDonald to complete their Reports. While the BCUA has established a CSO Supplemental Team for the District, many of the other permittees also established municipal based CSO Supplemental Teams. This report only covers those activities that were undertaken on a regional basis. Individual municipalities will report on their local supplemental team efforts separately.

This Public Participation Process Report includes:

1. an overview of the activities surrounding the formation and of a Supplemental CSO Team.
2. a description of all communication methods used to inform the public.

3 Supplemental CSO Team

According to the NJPDES permit, the Bergen County Utilities Authority (BCUA), and each of the member municipalities with combined sewer systems shall invite members of the affected/interested public to establish a Supplemental CSO Team to work with the permittee's consultants and assigned staff as an informal work (advisory) group and to act as a liaison between the general public and the decision makers for the permittee. The goals of the Supplemental CSO Team were to consist of the following elements:

- Meet periodically to assist in the sharing of information, and to provide input to the planning process;
- Review the proposed nature and extent of data and information to be collected during LTCP development;
- Provide input for consideration in the evaluation of CSO control alternatives; and
- Provide input for consideration in the selection of those CSO controls that will cost effectively meet the Clean Water Act requirements.

3.1 Creation of Supplemental CSO Team

The BCUA CSO Group established a Supplemental CSO Team by posting an invitation on its website providing notification of the project and inviting individual members, or interest groups with the community to join. The website invitation was kept active for approximately a one-month period, but with no success. In an effort to obtain regional input the BCUA extended a personal invitation to the Hackensack River Keeper, who accepted. In addition, each member of the BCUA CSO Group was invited to designate two members of their municipality or supplemental team to join the Regional Team. The members were selected to represent each of the CSO communities in the BCUA service area.

The following outlines the members of the Regional CSO Supplemental Team and the entity they represent:

City of Hackensack
Susan McVeigh, Health Officer
Wayne Vreisema, Hackensack Health Department

Village of Ridgefield Park
Stephen Quinn, Ridgefield Park Environmental Commission
Mark Olson, Chairman, Green Team
Alan O'Grady, Superintendent, Ridgefield Park

Borough of Fort Lee
Jan Goldberg, Borough of Fort Lee
Bob Applebaum, Borough of Fort Lee

BCUA District
Dominic DiSalvo, BCUA
Capt. Bill Sheehan, Hackensack Riverkeeper
Michelle Langa, Attorney, Hackensack Riverkeeper

Consultants
Francis Reiner, Senior Urban Designer. LLA-PP
Gary Grey, HDR
Frank Belardo, Arcadis
Mark Delbove, Arcadis

Meetings for the most part were scheduled at least one month ahead and, in most cases, a preliminary date for the next meeting was set at the end of each meeting. Attendance at each meeting was good, with most of the members attending each meeting. Care was taken to ensure that there was always adequate representation from each entity. In addition to the regular members, representatives from the DEP attended several meetings to provide input. Several of the members also participate on the Supplemental CSO teams in their individual member municipalities.

3.2 Meeting Schedule

The initial task requirements under the individual permits did not include any activities that we felt would be of interest to the Supplement Team. Past experience with public participation indicates that once groups are formed they need to meet on a continuous basis with presentations on items of interest to the group. Accordingly, it was decided that the development of the CSO Supplemental Team would begin in the first quarter of 2017 with meetings scheduled on a quarterly basis thereafter. Each meeting had a general theme that provided some preliminary education on combined sewer systems or the various tasks that needed to be completed under the permit. The BCUA CSO Group has held quarterly meetings of the Supplemental CSO Team beginning in June of 2017, and thereafter on the following dates:

- June 13, 2017 – Project introduction and overview; DEP presentation (Appendix A)

- September 19, 2017 – Models and project scheduling (Appendix B)
- December 12, 2017 – Green infrastructure (Appendix C)
- April 10, 2018 – Sensitive areas, typical year analysis, models and Sewer System Characterization Report. (Appendix D)
- June 12, 2018 – Results of Sewer System Characterization Study and Report (Appendix E)

Detail information, such as the sign-in sheets, Power Point presentations made to the group, and meeting minutes are provided in the appendices as noted above. The Group will continue meeting on a quarterly basis to discuss future topics including: discuss and overview of CSO control alternatives; results of CSO control alternatives analysis; receiving water quality; and recommended plans and implementation schedules from each of the CSO communities.

3.3 Role of the CSO Supplemental Team

The role of the CSO Supplemental Team is first to become knowledgeable in the issues related to combined sewer systems, their impact on the environment, and the pros and cons of alternative control alternatives being considered. Second, the Supplemental CSO Team acts in an advisory role to provide feedback during the meeting discussions and to provide input on local issues that may impact or help direct the final CSO LTCP. Last, but perhaps most importantly, members of the Team are in positions to provide information to the organizations with which they are affiliated, and the general public. They act as liaisons between the BCUA CSO Group and the public, and local planning or civil organizations.

4 Communication Methods to Inform the Public

According to the NJDPES permit, the members of the BCUA CSO Group were required to conduct outreach to inform the affected/interested public (during the development of the permittee's LTCP) through various methods which may include: public meetings, direct mailers, billing inserts, newsletters, press releases to the media, postings of information on the permittee's website, hotline, development of advisory committees, etc. In addition, each of the permittees that own and operate CSO outfalls were required to provide a web based notification system, or an automatic calling system that individuals could sign up for that would provide notification of the probability of a CSO discharge and its location on the waterway.

4.1 Affected Public

Below outlines the general groups of the public that have been, or still will be targeted for this public participation program. As previously noted, an invitation to join the BCUA CSO Group Supplemental Team was posted on the BCUA website, with little success. Individual members of the BCUA CSO Group may use council meetings, planning board meeting, newsletters, municipal websites, and local events and fairs to provide additional information on this program to the public as follows:

1. Government representatives – The Mayors, Council Members and Authority leadership of the members of the BCUA and surrounding municipalities have been and will be invited to participate in all aspects of the program.
2. Local planning boards and others involved in growth and development in the affected communities.
3. People with economic interest/ratepayers – Anyone who will be affected financially by the project will be targeted.
4. Industrial users of the sewer system – Representatives of industries in and around the area will be included.
5. Upstream and downstream residents, as well as any interested persons, will be targeted.
6. People who use and enjoy the downstream waters – Any individuals or groups that use the waterways for recreation will be included.
7. Residents or businesses that may be affected by construction – In general this segment would be anyone who lives or works near the CSO regulators and receiving waters, which are the areas that would be impacted by construction of controls. We will reach out to them to seek input on issues related to any inconvenience or financial impact that they might experience.
8. Special interest groups – This includes any groups that would have an interest in the CSO issue. We will reach out to neighborhood associations, tenant groups, local environmental groups, Environmental Commissions, schools, rotary clubs and any other active local organizations.
9. Private Citizens – All private citizens in the affected areas will be given the opportunity to provide input and participate fully in the public participation program.
10. Children – We will supply children with information about the project and the importance of keeping our waterways clean. Public Education, including education of children, is important to change the way the general public thinks about and controls pollution. The goal will be to educate the general public in an effort to change public behavior over time. We will develop general information on pollution control (i.e. water pollution, litter, yard waste, herbicides/pesticides, etc.). We will also reach parents by informing children.

4.2 Goals and Desired Outcomes for Involving the Public

The groups listed above come to this issue with varied levels of knowledge on the topic. We began by explaining in simple terms the history of the infrastructure and how a combined sewer system works. Later, the audiences learned about the anticipated pollutant loads from CSO discharges, environmental impacts, control alternatives including a cost-benefit analysis, the effects on recreation, and anticipated water quality benefits or improvements. Issues that need to be considered include water quality standards, use attainability, and consideration of other pollution sources that will not be controlled by this program. Accordingly, the following are specific issues for which public comment may be solicited in the future:

1. Selection of long-term CSO Controls -- We will present information on existing water quality issues, the anticipated pollutant contribution from CSO discharges, options on CSO Long-term Controls; the costs of each option relative to performance, and the anticipated cost impact to the Group. The Group will seek public comment on the level of control that should be implemented and input on the anticipated cost impact.

2. The importance of compliance with existing water quality standards and designated or ultimate use of swimmable and fishable within the receiving waters surrounding the area.
3. Should the members of the BCUA and other municipalities in highly urbanized areas seek a lessening of the water quality standards or designated uses on the basis that existing Water Quality Standards (WQS) may be unattainable at any cost? Should wet-weather discharge or receiving WQS be acceptable?
4. The current Water Quality Standards for treatment facilities require that all discharges meet effluent standards at the discharge pipe, however the NJDEP has noted that it will evaluate water quality instream. Should the EPA/NJDEP allow mixing or dilution zones in the establishment of wet weather discharge limits on CSO control facilities?

In addition to the above, the Public Participation Program may seek to solicit input from the public on other topics that may be viewed as critical to the program.

4.3 Description of Outreach Methods

The BCUA provided support for the member entities. The Borough of Fort Lee, City of Hackensack and Village of Ridgefield Park each developed communication plans and created Supplemental CSO Teams independently.

4.3.1 Notification of CSO Discharges

Section IV.F.8.b.iii of the individual NJPDES Permits required that the permittee “create and maintain on a daily basis a telephone hot line or website for interested citizens inquiries to provide up-to-date information regarding where CSO discharges may be occurring or that discharges are not or are unlikely to be occurring.” CSO discharges in this region are not restricted to Fort Lee, Hackensack, and Ridgefield Park and thus it was determined that a more regional approach to the notification requirement would be advantageous. Fort Lee, Hackensack, and Ridgefield Park all joined the NJ CSO Group that was started and organized by the Passaic Valley Sewerage Commission to undertake studies or programs that could be paid for jointly at a much lower cost. The NJ CSO Group retained HDR to develop and maintain a public information website that would provide public notification of CSO discharges for most of its members. The website is located at: <http://njcso.hdrgateway.com>

4.3.2 Other Public Communication Methods

The BCUA CSO Group members have determined that they would like to use the tools that they are currently using to communicate with the general public on the CSO matter. All of the members maintain their own websites, and many of the members use newsletters to communicate with the general public. It was determined that these methods are effective in communicating with the public and thus should be expanded under this program.

General information was developed on the regional approach to the program and distributed to members for use or possible modification for their own use. The BCUA made the following available for use by the members of the BCUA CSO Group:

- Articles or supplements that can be added to each community newsletter – The group determined that a periodic newsletter or article would be a good means of communicating to the public. Mott MacDonald developed a general information newsletter that was provided to each of the members to

include in their own publications during the upcoming months. It is anticipated that new newsletter will be produced either semi-annually or annually as needed. These newsletters will explain to the public the information process and the activities of the Team, as well as summarizing submitted reports for the duration of the program. The first newsletter is provided in Appendix F.

- Website copy that can be adapted by each member – Mott MacDonald produced content that can be posted on the BCUA website and adapted for the member websites. All articles have links to the sites of member entities as well as Power Points and minutes from supplemental CSO Team meetings. The content includes general CSO education and information discussed at the public and will be updated as work progresses. The initial website copy is provided in Appendix G.
- A Homeowner's Guide brochure – This brochure, produced by BCUA, provides useful information about rain-derived infiltration and inflow reduction and the sanitary sewer overflow elimination program. It provides information about the BCUA discount rain barrel program as well. Copies of this brochure are being made available to members of the group for distribution to their municipal buildings and/or libraries. The copy of the brochure is provided in Appendix H.
- Handouts from various entities including NJ Future and Clean Water NJ have been used by members of the CSO Group for distribution to the public.
- Signage templates for use in creating notices at each outfall location (See Appendix I)
- Earth Day Celebrations – BCUA provided handouts and rain barrel demonstration for the Ridgefield Park Celebration.

4.3.3 Planned Future Outreach and Engagement Activities

As the LTCP process progresses, Mott MacDonald will continue to support each of the member entities with their communication programs. We plan to do this through the following potential means and methods:

1. Providing additional website copy, newsletter copy and handouts as needed as information becomes available.
2. Supplying copy for periodic press releases as news becomes available.
3. Coordinating materials for booths at regional fairs.
4. Attending planning board/council meetings as requested.

4.3.4 Consideration of Feedback From the Public

Feedback from public and other sources will be developed throughout the process, but especially during development of the CSO LTCP. Feedback from the public will be evaluated and/or considered throughout the process, but especially during development and siting of control alternatives and changes to the LTCP will be considered by each municipal consulting team, however it is anticipated that not all suggestions or concerns can be accommodated. To the extent possible, the concerns of the public will contribute to a solution that satisfies the needs of all involved.

5 Appendices

Appendix A. June 13, 2017 – Project Introduction and Overview; DEP presentation

**Bergen County Utilities Authority
Supplemental CSO Team
Meeting Number 1 – Project Introduction**

BCUA Administration Building, Public Meeting Room
June 13, 2017, 9 – 10:30 am

Group Meeting Minutes

1. Introductions

The meeting began at 9:05 am with introductions of all members present.
See sign in sheet

2. Presentation

Overview of CSOs and Permit Requirements
John Rolak, Mott MacDonald
See power point slides

3. NJDEP presentation

Presentation covered the three questions:

- What is a CSO?
- What does it look like?
- What is being done?

Nancy Kempel, NJDEP-CSO
See power point slides

4. Status Reports

- a. Ridgefield Park** – They have been modeling the system and recording all manholes using GPS. The first Supplementary CSO team meeting was held in May.
- b. Hackensack** – They have recorded their manholes on GIS maps and televised all CSOs. They have created their system characterization model using existing data. They will be participating with PVSC for the Compliance Monitoring Plan. They held their first Supplemental CSO team meeting in April. They have begun to partially separate a portion of Main Street as part of phase one of their redevelopment project.
- c. Fort Lee** – They have made their 2006-07 model. They are redefining a new redevelopment zone in the model to account for green infrastructure. Their first Supplementary CSO Team has not met yet due to scheduling issues with the members. PVSC sampling program is going on now.
- d. BCUA** – They are currently monitoring the interceptor sewers using 10 temporary meters plus existing BCUA meters. They have good wet weather data since March. They still need some thunderstorm data so they can identify any variations. Monitoring should be completed by July. At

that time BCUA will incorporate the models from each municipality to create one integrated model.

5. **Next Steps** -- The next meeting will be held in mid-September.
6. **Next meeting** – We will send out some dates by the end of June
7. **Adjournment** – 10:30 am

Bergen County Utilities Authority
Supplemental CSO Team
Meeting Number 1 – Project Introduction
BCUA Administration Building, Public Meeting Room
June 13, 2017, 9 – 10:30 am

Name	Organization	Email	Phone Number
John Rolak	Mott MacDonald	john.rolak@mottmac.com	973-912-2521
John Dening	Mott MacDonald	anna.gregory@mottmac.com	908-7270638
Donna Gregory	Mott MacDonald	john.denings@mottmac.com	973-912-2464
Susan McVeigh	Health Officer, Hackensack	SMcVeigh@hackensack.org	201-646-3868
Francis Reiner	Senior Urban Designer, LLA-PP		
Mark Olson	Chairman, Green Team	L. Quinn for Mark Olson	
Steve Quinn	Ridgefield Park Environmental Commission	stephquinn@aol.com	201-440-5652
Bob Applebaum	Borough of Fort Lee	BApplebaum@aol.com	201-650-3363
Jan Goldberg	Borough of Fort Lee	J-Goldberg@fortlee.nj.org	201-592-3500 EXT 1070
Captain Bill Sheehan	Hackensack Riverkeeper		
Michelle Langa	Hackensack Riverkeeper, attorney	legal@hackensackriverkeeper.org	201 968 0808
Wayne Vreisema	Hackensack Health Department		
Mark Del Bove	Arcadis US Inc	mark.delbove@arcadis.com	201-398-4320
Gary Gray	HPR	gary.gray@hprinc.com	201-335-8868
Edward Mignone	Boro of Fort Lee	e-mignone@fortlee.nj.org	201-592-3500

on phone

Bergen County Utilities Authority
Supplemental CSO Team
Meeting Number 1 – Project Introduction
BCUA Administration Building, Public Meeting Room
June 13, 2017, 9 – 10:30 am

Name	Organization	Email	Phone Number
Jennifer Feltis Cortez	NJ DEP	jennifer.feltis@dep.nj.gov	609-984-3451
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Stephen Seeger	"	stephen.seeger@dep.nj.gov	609 984 4428
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Row Phillips	B.C.U.A		732-921-3233
Alan O'Grady	R.F. DPW	A06560@AOL.com	201-440-4860
Jesse D'Amico	HACK, DPW	JVDA44@AOL.com	(201)-321-5324

6/25/2018



Supplemental CSO Team

Meeting Number 1 – Introduction

Bergen County Utilities Authority CSO Group

June 13, 2017

Safety moment

Think about and share a safety moment:

- Please be aware of your surroundings
- What to do in case of an emergency.
 - Emergency Exits
 - Muster Location

Meeting No. 1 | Presentation 2

6/25/2018

BCUA Supplemental CSO Team

Meeting No. 1 Agenda

Important points to cover:

- What is a Combined Sewer System?
- What is a Combined Sewer Overflow?
- What is the BCUA CSO Group?
- Why are they undertaking this Project?
- What are the Requirements?
- What are the Deadlines?
- What is my role?

Meeting No. 1 | Presentation

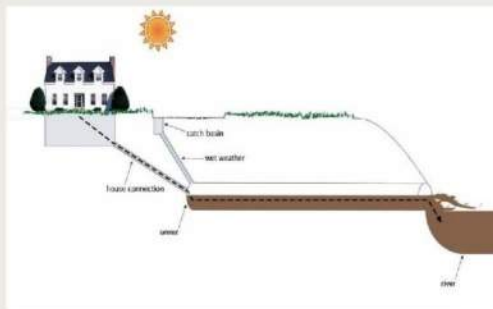
What is a Combined Sewer System?

Oldest Sewers in Country

Combined sewers carry both sewage and stormwater in the same pipe.

Started in mid-1800s when pipes discharged directly into the nearest water body.

By the turn of the century our rivers turn to open sewers producing foul odors and spreading disease.



Meeting No. 1 | Presentation

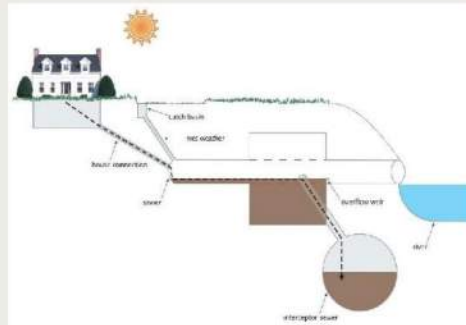
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6/25/2018

What is a Combined Sewer System?

Oldest Sewers in Country

Starting at the turn of the century sewers and treatment plants are constructed to collect and treat sewage. This effort, however, is not completed in the Region until the 1970s.



Meeting No. 1 | Presentation

5

What is a Combined Sewer Overflow (CSO)?

Oldest Sewers in Country

Hydraulic relief, however, is needed during wet weather periods to limit the size and cost of Interceptor Sewers and Sewage Treatment Plants resulting in Combined Sewer Overflows (CSO).



Meeting No. 1 | Presentation

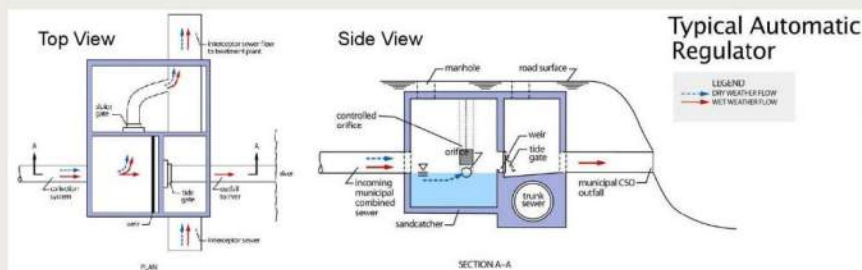
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6/25/2018

What is a Combined Sewer Overflow?

Oldest Sewers in Country

Wet Weather Flows to the Sewage Treatment Plant are Controlled by CSO Control Facilities



Meeting No. 1 | Presentation

7

BCUA Supplemental CSO Team

Meeting No. 1 Agenda

The BCUA CSO Group has Four Members

- Bergen County Utilities Authority (BCUA)
 - Provides Wastewater Treatment to 47 Municipalities
 - Of Which Three have Combined Sewer Systems
- Three Municipalities Have Combined Sewer Systems and own and operate CSO Outfalls
 - Borough of Fort Lee
 - City of Hackensack; and
 - Village of Ridgfield Park

Meeting No. 1 | Presentation

4

6/25/2018

Why are the members of the BCUA CSO Group Undertaking this Project?

New Jersey Pollutant Discharge Elimination System (NJPDES)

NJPDES Individual Permit Issued March 12, 2015

Has Numerous Tasks that Need to be Completed in a:

- Three Year Time Period if Undertaken Individually
- Five Year Time Period if Undertaken Together

Meeting No. 1 | Presentation

9

Why are the Members of the BCUA CSO Group Undertaking this Project?

New Jersey Pollutant Discharge Elimination System (NJPDES)

NJPDES Individual Permit separates requirements into two categories:

- Those permittees that own and operate CSO Outfalls and discharge CSOs:
Fort Lee, Hackensack, & Ridgefield Park
- Those permittees that transport and treat wastewater flows from combined sewer systems.
BCUA

Meeting No. 1 | Presentation

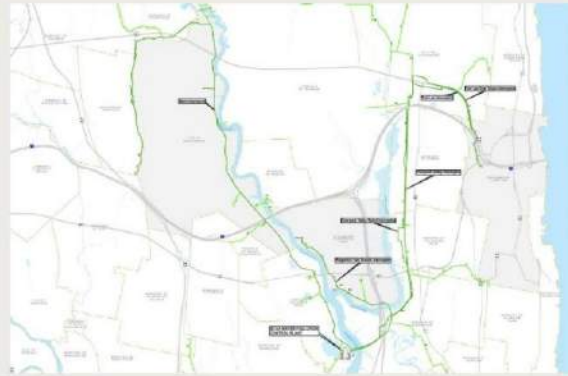
10

6/25/2018

BCUA Supplemental CSO Team

Meeting No. 1 Agenda

The NJPDES Permit all Requires permittees that form a hydraulically connected system to complete a Regional CSO Long Term Control Plan



BCUA Supplemental CSO Team

Meeting No. 1 Agenda

BCUA CSO Group Members are:

- BCUA
- Borough of Fort Lee
- City of Hackensack; and
- Village of Ridgefield Park

All Members have Agreed to Work Together to Develop a CSO Long Term Control Plan (LTCP)

Agreement Provided an Additional Two Years in the Schedule for Completion

Meeting No. 1 | Presentation

6/25/2018

BCUA Supplemental CSO Team

Meeting No. 1 Agenda

- The BCUA CSO Group is Undertaking the Regional LTCP Separately, but Together:
 - Each Municipality is Responsible for Developing All Reports for their System.
 - BCUA is establishing Guidelines and Undertaking Certain Required Tasks for the Group
 - Group Meeting are Held Monthly to Coordinate, and Agree upon Schedules, Tasks, and to Share Information.
 - BCUA will be Combining Individual Computer Models into one Regional Model.
 - BCUA is Compiling and Coordinating Report Submissions to NJDEP

Meeting No. 1 | Presentation

New Jersey Pollutant Discharge Elimination System (NJPDES)

Summary and Breakdown of Tasks

NJPDES Individual Permit Issued March 12, 2015 requires all Permittees to:

- Update system data compiled in 2006
- Revise Rules/Ordinances on Sewer Use
- Update Operation and Maintenance Manual
- Create and Maintain a CSO Hotline or Website
- Update Standard Operational Procedures (SOPs)
- Develop an Asset Management Plan

Meeting No. 1 | Presentation

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6/25/2018

Work Completed to Date

Summary of Reports or Requirements that are to be Completed and Retained On-Site (i.e. not submitted to the Department)

Permit Condition	Abbreviated Description of Requirement	59 Month LTCP Due Date
Part IV.D.2.c	Install outfall signs <i>Permittees with CSO Outfalls Only</i>	January 1, 2016
Part IV.F.1.f	Update the characterization of the system's infrastructure (list of sewer system components and STUs) using a spreadsheet	January 1, 2016
Part IV.F.1.h	Create anticipated schedule to revise Rules/Ordinances/Sewer Use Agreements to reduce I/I	January 1, 2016
Part IV.F.1.i and Part IV.D.4.b.iv	Insert SOPs in O&M Manual	January 1, 2016
Part IV.F.1.g	Insert characterization on a GIS Map	July 1, 2016
Part IV.F.8.c.iii	Create and maintain Telephone Hot Line or Website	July 1, 2016
Part IV.D.4.b.iv	Update O&M Manual with SOPs, Asset Management Plan and Emergency Plan	July 1, 2016 and Annually thereafter
Part IV.F.1.k	Insert and update an Asset Management Plan in O&M Manual	July 1, 2016 and Annually thereafter

Meeting No. 1 | Presentation

15

New Jersey Pollutant Discharge Elimination System (NJPDDES)

Summary and Breakdown of Tasks

NJPDDES Individual Permit Issued March 12, 2015 required:

From Permittees with CSO Outfalls:

- Discharge Monitoring Reports (DMRs)
- Baseline Compliance Monitoring Program
- Consideration of Sensitive Areas
- Compliance Monitoring Program Report

Meeting No. 1 | Presentation

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6/25/2018

New Jersey Pollutant Discharge Elimination System (NJPDES) Summary and Breakdown of Tasks

NJPDES Individual Permit Issued March 12, 2015 also required:

From all Permittees:

- Global Positioning System (GPS) Data
- System Characterization Study
- Public Participation Process Report
- Development and Evaluation of Alternatives
- Submission of Long Term Control Plan (LTCP)
- Submission and Implementation of Alternatives Report

Meeting No. 1 | Presentation

17

Work Completed to Date

Summary of Reports Required to be Submitted to the Department

Permit Condition	Abbreviated Description of Requirement	59 Month LTCP Due Date
Part III <small>Permittees with CSOs/Outfalls Only</small>	Discharge Monitoring Reports (due 25 th day of the month following the reporting period) - Solids/Floatables and Precipitation	Monthly from July 1, 2015
Part IV.D.4.a	Submit Progress Reports (due 25 th day of the month following the quarter)	Quarterly from July 1, 2015
Part III <small>Permittees with CSOs/Outfalls Only</small>	Discharge Monitoring Report (due 25 th day of the month following the reporting period) – Duration of Discharge	Monthly from January 1, 2016
Part IV.D.2.a	Submit GPS latitude and longitude for pump stations, CSO regulators and CSO outfalls	January 1, 2016
Part IV.D.3.b.i	Submit System Characterization Work Plan	January 1, 2016
Part IV.D.3.c <small>Permittees with CSOs/Outfalls Only</small>	Submit Baseline Compliance Monitoring Program Work Plan	January 1, 2016
Part IV.D.2.b	Submit a map of combined and separate sewer areas	July 1, 2016

Meeting No. 1 | Presentation

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6/25/2018

Work Still to be Completed

CSO Submittal Summary

Summary of Reports Required to be Submitted to the Department

Permit Condition	Abbreviated Description of Requirement	59 Month LTCP Due Date
Part IV.D.3.b.ii	Submit System Characterization Report	July 1, 2018
Part IV.D.3.b.iii	Submit Public Participation Process Report	July 1, 2018
Part IV.D.3.d	Submit Compliance Monitoring Program Report	July 1, 2018
Part IV.D.3.b.iv	Submit Consideration of Sensitive Areas Plan*	July 1, 2018
Part IV.D.3.b.v	Submit Development and Evaluation of Alternatives Report	July 1, 2019
Part IV.D.3.b.vi	Submit Selection and Implementation of Alternatives Report in the Final LTCP	June 1, 2020

*Permittees With CSO Outfalls Only

Meeting No. 1 | Presentation

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Sewer System Characterization Report

Description and Status

Initial System Characterization Completed 2003 – 2006

Completed by Fort Lee, Hackensack, and Ridgefield Park

- Sewer System Mapping
- Dry and Wet Weather Monitoring at Regulators and Outfalls.
- Review of Land Use and Population Data
- Development of Land Side Computer Model
- Computer Output used to Characterize CSO Discharge

Meeting No. 1 | Presentation

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6/25/2018

Sewer System Characterization Report to Be Updated

Description and Status

In Most Municipalities:

- Land Use Has Not Changed.
- Population Has Not Changed.
- Sewer System Has Not Changed.

But computer models are old and no longer supported. New computer models will be used and therefore models need to be updated.

Meeting No. 1 | Presentation

Sewer System Characterization Report

Description and Status

System Characterization Updates Being Completed by:
Fort Lee, Hackensack, and Ridgefield Park

- Updating monitoring data to the extent needed:
 - Ridgefield Park doing flow monitoring in areas partially separated
 - Fort Lee doing additional flow and water quality monitoring in redevelopment areas
- All Permittees with CSOs are updating their computer models.

Meeting No. 1 | Presentation

6/25/2018

Sewer System Characterization Report

Description and Status

Initial System Characterization Completed 2003 – 2006

- Characterization Requirement was for CSO Communities Only
- BCUA had no Characterization requirements under the 2002 permit.
- BCUA is currently conducting metering and developing a computer model of its Interceptor Sewer System.

Meeting No. 1 | Presentation

Public Participation Process Report

Description

NJPDES Permit Requires Supplemental CSO Team

- Local and Regional Teams
 - Local Team to Deal with Local Issues
 - Regional Team to Deal with Overall Regional LTCP
- Seek to Actively Involve Affected Public
 - Rate Payers
 - Industrial Users
 - Environmental Groups
 - Integration with Municipal Agencies

Meeting No. 1 | Presentation

6/25/2018

Public Participation Process Report

Description

Supplemental CSO Team

- Quarterly Meetings Anticipated for
 - Permit Process and Requirements
 - System Characterization and Results
 - Status and Schedule for Each Process
 - Sensitive Area Analysis
 - Alternative Control Considerations
 - LTCP Alternatives and Costs
 - Implementation Schedule

Meeting No. 1 | Presentation

Public Participation Process Report

Description

Supplemental CSO Team

- Is Our Link to the General Public
- We Want You to Talk to Others
- Will Provide Input on Planning Process
- Will Provide Input for Consideration on
 - Evaluation of Sensitive Areas
 - Evaluation of CSO Control Alternatives
 - Selection of CSO Control Alternatives

Meeting No. 1 | Presentation

6/25/2018

Public Participation Process Report
Description

Supplemental CSO Team has an
Advisory Role!

Meeting No. 1 | Presentation

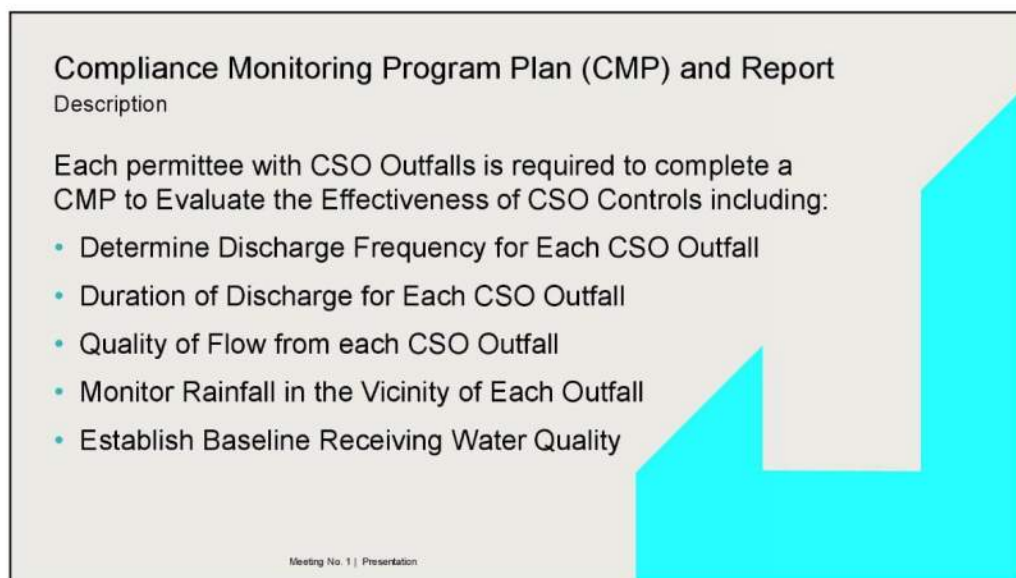


Compliance Monitoring Program Plan (CMP) and Report
Description

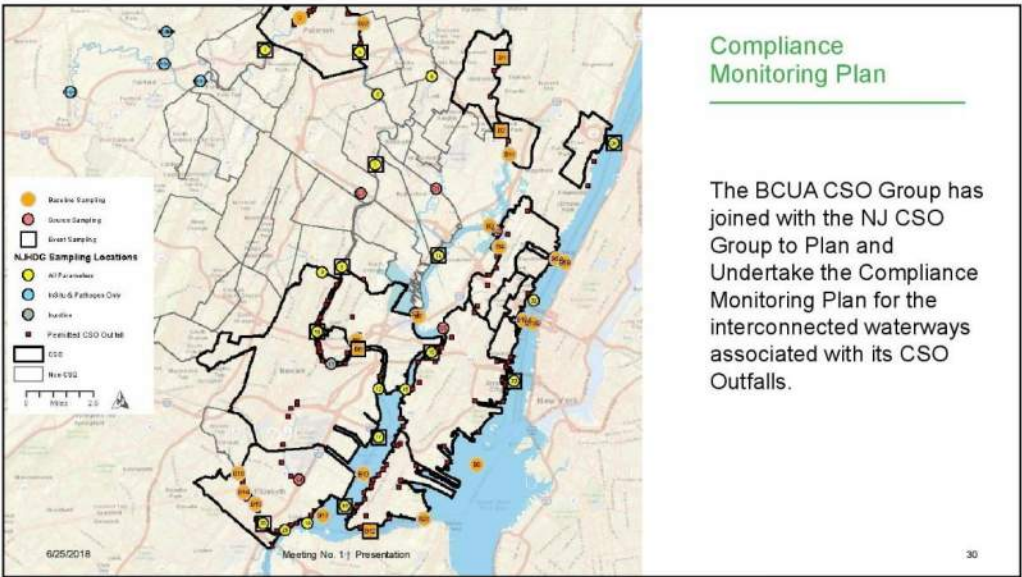
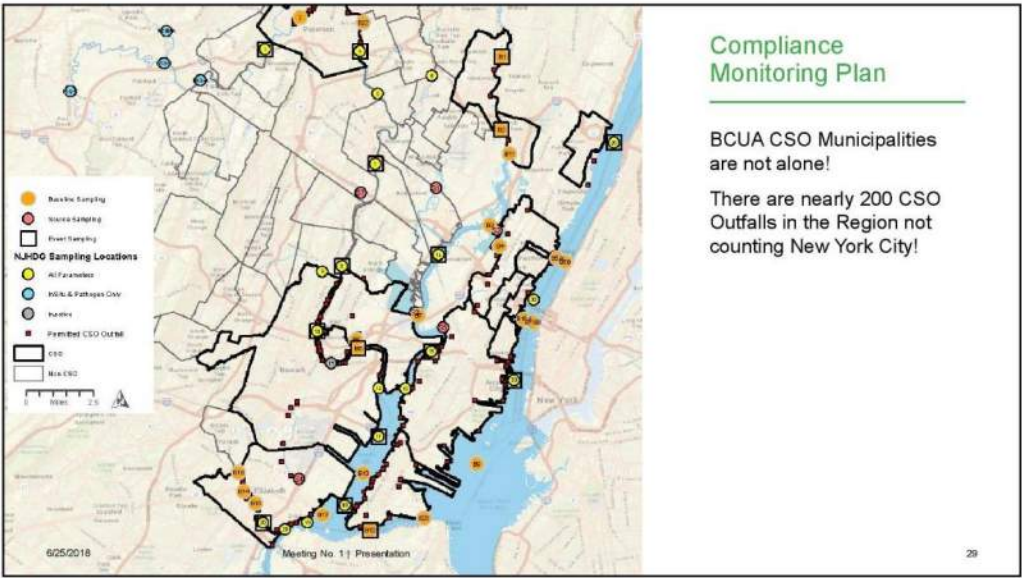
Each permittee with CSO Outfalls is required to complete a CMP to Evaluate the Effectiveness of CSO Controls including:

- Determine Discharge Frequency for Each CSO Outfall
- Duration of Discharge for Each CSO Outfall
- Quality of Flow from each CSO Outfall
- Monitor Rainfall in the Vicinity of Each Outfall
- Establish Baseline Receiving Water Quality

Meeting No. 1 | Presentation



6/25/2018



6/25/2018

Compliance Monitoring Program Plan (CMP) and Report

Description

The CMP will be used in the Future to Establish:

- Effectiveness of CSO Controls
- Compliance with Water Quality Standards
- Protection of Designated Uses

The Problem is that CSO Discharges are Not The Only Source of Pollutants in the Region!

Meeting No. 1 | Presentation

Compliance Monitoring Program Plan (CMP) and Report

Description

Accordingly, the CMP is being tied to a Receiving Water Model to Better Evaluate Water Quality in the Region and to determine:

- Existing Water Quality Compliance
- Impacts of CSO Discharges
- Impacts of Municipal Storm Sewer Systems (MS4)
- Impacts from New York City Combined Sewers

Meeting No. 1 | Presentation

6/25/2018


Compliance Monitoring Program Plan (CMP) and Report

Description

The CMP :

- Work Plans were submitted and approved by NJDEP.
- Dry Weather Monitoring has been Completed.
- Wet Weather Monitoring will be completed shortly.
- Additional information on findings will be presented at a future meeting.

Meeting No. 1 | Presentation



Compliance Monitoring Program Plan (CMP) and Report


Description

Deadline for Submission July 1, 2018

Work that we anticipate will be Presented to the CSO Supplemental Team in Future Meetings

- What is the current water quality within the Region?
- How does water quality vary within the Region?
- What are Wet Weather loads from CSO Discharges?
- What are Other Pollutant Loads within the Region?
- What load reductions are needed to meet Water Quality?

Meeting No. 1 | Presentation



6/25/2018

Development and Evaluation of Alternatives

Description

Deadline for Submission July 1, 2019

- Work will be Presented to CSO Supplemental Team in Future Meetings
 - What are alternative controls?
 - Space requirements for each
 - What are the costs associated with each?
 - Construction Costs
 - Operation and Maintenance Costs
 - Anticipated Benefits

6/25/2018

Meeting No. 1 | Presentation

Selection and Implementation of Alternatives Report In the Final LTCP

Description

Deadline for Submission June 1, 2020

- Work will be Presented to CSO Supplemental Team in Future Meetings
 - What are alternative controls recommended?
 - What are the costs associated with the LTCP?
 - Construction Costs
 - Operation and Maintenance Costs
 - Implementation Schedule.
 - Anticipated Benefits

Meeting No. 1 | Presentation

6/25/2018

Questions?

Meeting No. 1 | Presentation

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MOTT
MACDONALD

Thank you

• BCUA CSO Group

• Supplemental CSO Team -
Meeting 1: Project Introduction



Meeting No. 1 | Presentation

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Combined Sewer Overflow Program Overview

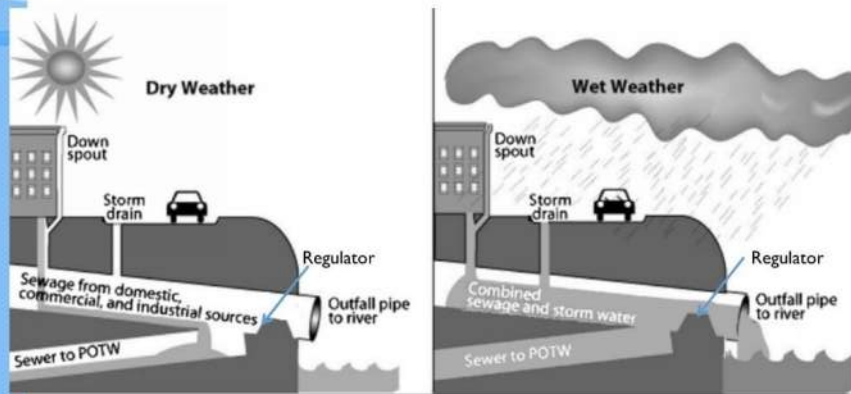
Division of Water Quality



Sewer System Types



Combined Sewer System Operation



Combined Sewer Systems

- Combined Sewer Systems are remnants of our country's early infrastructure. They are outdated and in need of repair.



CSOs in the US

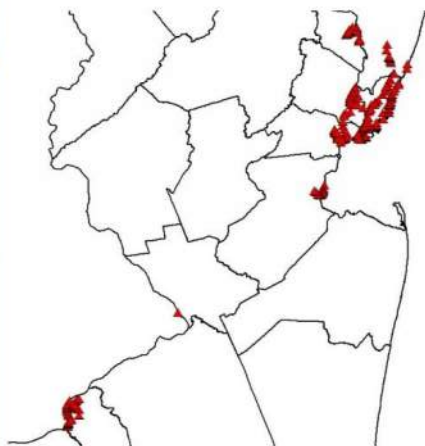


-772 communities

-9350 outfalls

-850 billion gallons discharged per year

CSOs in New Jersey



21 communities

210 permitted outfalls

23 billion gallons
discharged per year

9 POTWs

- Northeast: 179 outfalls, 7 communities and 7 POTWs
- Camden County: 30 outfalls, 3 communities and 1 POTW
- Trenton: 1 outfall, 1 community and 1 POTW

CSO Permits - Two Components

☐ **Nine Minimum Controls (NMC)**

- Simple, low cost measures
- Mostly carried forward but with some enhancements

☐ **Long Term Control Plan (LTCP)**

- Goal is to reduce or eliminate CSO discharges to comply with the CWA
- Dictates a path to achieve that goal
- Substantially new requirements
- Due June 2020

Nine Minimum Controls (NMC)

- ☐ Proper operation and maintenance
- ☐ Maximize use of collection system for storage
- ☐ Review of pretreatment requirements
- ☐ Maximize flow to POTW for treatment
- ☐ Elimination of discharges during dry weather (SSO)
- ☐ **Control of solids/floatables**
- ☐ Pollution prevention
- ☐ **Public notification (signs & website)**
- ☐ Monitoring of impacts and efficacy of controls

CSO - Outfall



Nets Can Be Exposed



S/F Nets Under Stress



Nets Can Be Exposed



Nets Can Be Exposed



S/F Nets Can Be Hidden



S/F Nets Can Be Hidden



Public Notification – Two Signs



CSO Websites



11/29/16; 4:57 PM

<http://www.nhudsonsa.com/Public/waterbody.html>

Long Term Control Plan (LTCP)

- ❑ System characterization, monitoring and modeling
- ❑ **Public participation**
- ❑ **Consideration of sensitive areas**
- ❑ Evaluation of CSO control alternatives
- ❑ Cost/performance considerations
- ❑ Operational plan
- ❑ Maximization of treatment at the POTW
- ❑ Implementation schedule
- ❑ Post-construction compliance monitoring

Public Participation

- ❑ Permittees are required to seek public input throughout the LTCP process via the Supplemental CSO Team:

- Where is flooding?
- What abatement strategies should be considered?
- What should be the LTCP schedule?



- ❑ Permittees are not *required* to follow public input.

Consideration of Sensitive Areas

- ❑ Sensitive areas can include: ONR Waters, T&E species, Drinking Water Intakes and Primary Recreation (Bathing beaches)



- ❑ Sensitive Areas are given the highest priority

Questions?

Nancy Kempel
CSO Program
Division of Water Quality
Nancy.Kempel@dep.nj.gov
(609) 984-4428



Appendix B. September 19, 2017 – Models and Project Scheduling

**Bergen County Utilities Authority
Supplemental CSO Team
Meeting Number 2 – Project Introduction**

BCUA Administration Building, Public Meeting Room
September 19, 2017, 9:00 AM – 10:00 AM

Group Meeting Minutes

Attendees:

See sign in sheet (attached)

1. Safety Minute

The meeting began at 9:05 AM with John Rolak sharing some safety tips on hurricanes.

2. Presentation

System Monitoring and Modeling (attached)

Improvements to Ridgefield Park model

Typical Year analysis

Project schedule

John Rolak, Mott MacDonald

See power point slides

3. Discussion

- a. Will BCUA use the same Typical Year as PVSC? It is important for everyone to use the same year to minimize challenges. While there are some differences in opinion on the analysis they are not significant enough to go it alone.
- b. Why wasn't the Teterboro rain gauge used? Teterboro is not as centrally located among all the members of the NJ CSO Group. Newark has a longer period of record.
- c. Will we need to update the Technical Guidance Manual? Our understanding is that PVSC is updating the manual, and will make that available to the members of the NJ CSO Group, if not, we will need to update it.
- d. What about Green Stormwater Infrastructure (GSI)? NJDEP is preparing a guidance document for GSI.


4. Next meeting – The next meeting will be held in December

5. Adjournment – 9:55 AM

Bergen County Utilities Authority
Supplemental CSO Team
Meeting Number 2
BCUA Administration Building, Public Meeting Room
September 19, 2017, 9 – 10:30 am

Name	Organization	Email	initials
John Rolak	Mott MacDonald	John.rolak@mottmac.com	<i>JR</i>
John Dening	Mott MacDonald	John.denning@mottmac.com	<i>JD</i>
Donna Gregory	Mott MacDonald	Donna.gregory@mottmac.com	
Susan McVeigh	Health Officer, Hackensack	smcveigh@hackensack.org	<i>SM</i>
Francis Reiner	Senior Urban Designer, LLA-PP	francisr@dmrarchitects.com	<i>FAR</i>
Mark Olson	Chairman, Green Team	Mark-olson@verizon.net	<i>MO</i>
Stephen Quinn	Ridgefield Park Environmental Commission	stephencquinn@aol.com	
Bob Applebaum	Borough of Fort Lee	Bappelbaum@aol.com	<i>BA</i>
Jan Goldberg	Borough of Fort Lee	j-goldberg@fortleenj.org	
Captain Bill Sheehan	Hackensack Riverkeeper	captain@hackensackriverkeeper.org	<i>BS</i>
Michelle Langa	Hackensack Riverkeeper, attorney	legal@hackensackriverkeeper.org	
Wayne Vriesema	Hackensack Health Department	wvriesema@hackensack.org	
<i>Vishal Shah</i>	<i>Arcades</i>	<i>vishal.shah@arcades.com</i>	<i>VS</i>
<i>John Flannigan</i>	<i>Hackensack</i>	<i>JGFlannigan@aol.com</i>	<i>JF</i>
<i>Alan O'Grady</i>	<i>Ridgefield Park</i>	<i>AOG560@AOL.com</i>	<i>AO</i>
<i>Sal Pagano</i>	<i>Fort Lee</i>	<i>njlal128@aol.com</i>	<i>SP</i>
<i>Gary Strydom</i>	<i>WDR Inc</i>	<i>gary.strydom@hudsonia.com</i>	<i>GS</i>
<i>Edward Mignone</i>	<i>Fort Lee</i>	<i>e-mignone@fortleenj.org</i>	<i>EM</i>

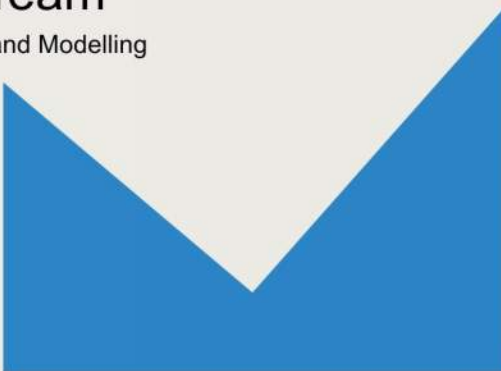
9/26/2017



Supplemental CSO Team

Meeting Number 2 – System Monitoring and Modelling
September 19, 2017

BCUA CSO Group:
Borough of Fort Lee
City of Hackensack
Village of Ridgewood Park
Bergen County Utilities Authority



Safety moment

Think about and share a safety moment:

- We are still in Peak Hurricane Season

Refer to the Federal Emergency Management Agency's (FEMA) [Ready.gov/hurricanes](https://www.ready.gov/hurricanes) for comprehensive information on hurricane preparedness at home and in your community.

Information on how to prepare and take action are available on:

- [Gather Information](#)
- [Plan & Take Action](#)
- [Recover](#)
- [Resources](#)



September 19, 2017 2

9/26/2017

BCUA Supplemental CSO Team

Meeting No. 2 Agenda

Refresher – In Meeting #1 We Covered:

- What is a Combined Sewer System?
- What is a Combined Sewer Overflow?
- What is the BCUA CSO Group?
- Why are they undertaking this Project?
- What are the Requirements?
- What are the Deadlines?
- What is my role?

September 19, 2017

Any Questions on Previous Topics?

September 19, 2017

4

9/26/2017

BCUA Supplemental CSO Team

Meeting No. 2 Agenda

- Reminder: The BCUA CSO Group is Undertaking the Regional LTCP Separately, but Together:
 - Each Municipality is Responsible for Developing All Reports for their System.
 - BCUA is establishing Guidelines and Undertaking Certain Required Tasks for the Group
 - Group Meeting are Held Monthly to Coordinate, and Agree upon Schedules, Tasks, and to Share Information.
 - BCUA will be Combining Individual Computer Models into one Regional Model.
 - BCUA is Compiling and Coordinating Report Submissions to NJDEP

September 19, 2017

Sewer System Characterization Report

Description and Status

Initial System Characterization Completed 2003 – 2006

Completed by Fort Lee, Hackensack, and Ridgefield Park

- Sewer System Mapping
- Dry and Wet Weather Monitoring at Regulators and Outfalls.
- Review of Land Use and Population Data
- Development of Land Side Computer Model
- Computer Output used to Characterize CSO Discharge

September 19, 2017

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9/26/2017

Sewer System Characterization Report

Description and Status

System Characterization Updates Being Completed by:
Fort Lee, Hackensack, and Ridgefield Park

- Updating monitoring data to the extent needed:
 - Ridgefield Park completed flow monitoring in areas partially separated
 - Fort Lee doing additional flow and water quality monitoring in redevelopment areas
- All Permittees with CSOs are updating their computer models.

September 19, 2017

Sewer System Characterization Report

Description and Status

System Characterization Status Update

- BCUA has completed data collection and is currently reviewing data and developing their computer model
- Fort Lee is undertaking additional monitoring and will then update their modeling
- Hackensack has completed their model update.
- Ridgefield Park will complete their model update by October 1st.

September 19, 2017

9/26/2017

Sewer System Characterization Report

Description and Status Update for

Outline and Status of

Village of Ridgefield Park

Monitoring and Modeling

September 19, 2017

5

Where is Ridgefield Park in Relationship to Other CSOs?

Figure 1-1: Participating N/CSO Group Members and Associated Central Sewage Treatment Facilities

Ridgefield Park

9/11/2017

Meeting No. 2 | Presentation

10

9/26/2017

Sewer System Characterization Report Update

Ridgefield Park Info Works Computer Model Update

- ☐ Computer Model Updated from Info Works CS to Info Works ICM (Integrated Catchment Model)
- ☐ GIS Data Imported to Model for Sewer Network.
- ☐ New Flow Data Used to Better Calibrate Model.

9/11/2017

Meeting No. 2 | Presentation

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Sewer System Characterization Report Update

Ridgefield Park Info Works Computer Model Update

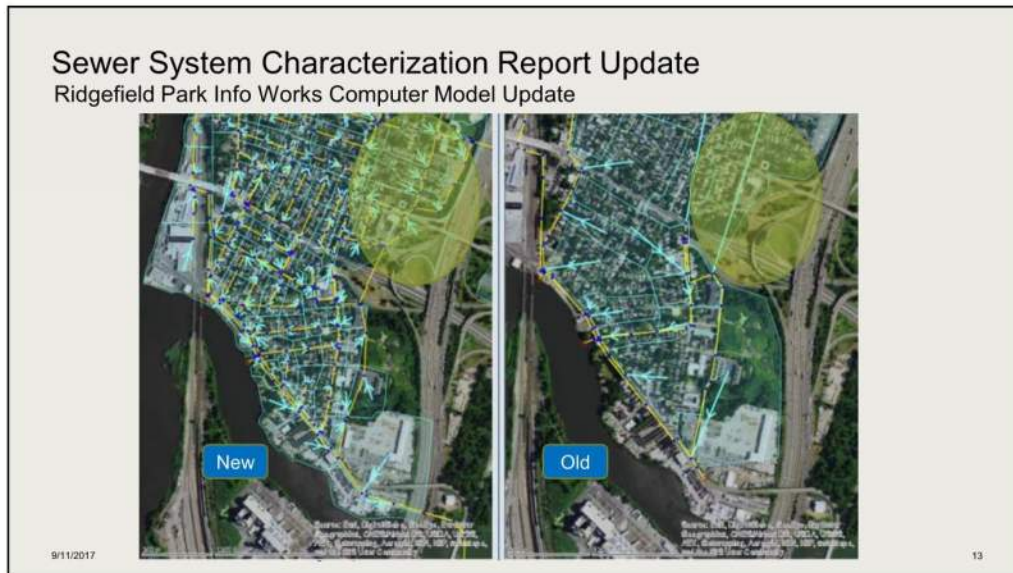


- GIS Sewer Reaches and Details Added to Model

9/11/2017

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9/26/2017




9/26/2017

Sewer System Characterization Report Update

Ridgefield Park Info Works Computer Model Update

- Additional Separate Storm Sewer Reaches Located and Added to Model




9/11/2017

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Sewer System Characterization Report Update

Ridgefield Park Info Works Computer Model Update



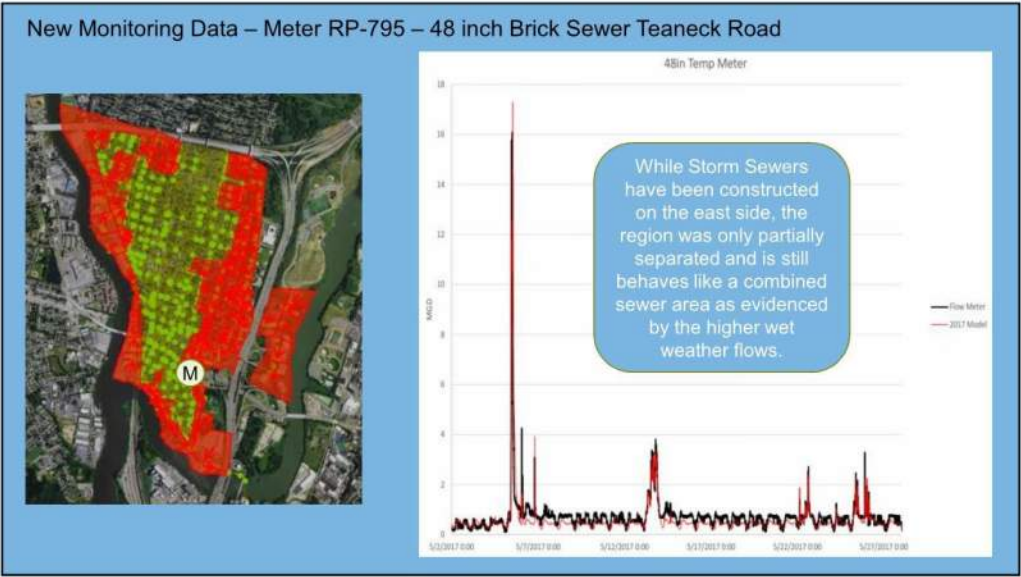
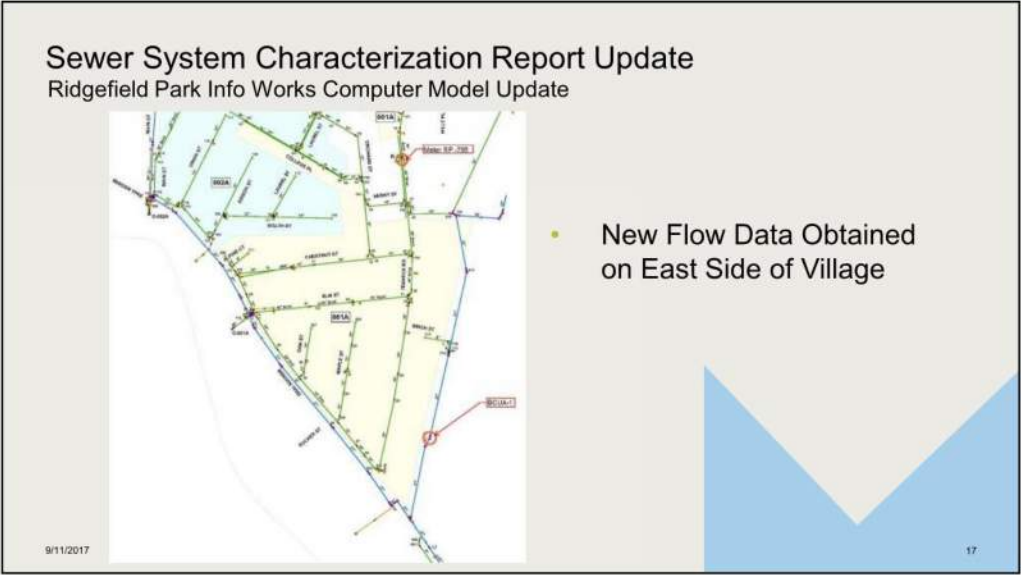
- New Flow Data Obtained on East Side of Village

9/11/2017

Meeting No. 2 | Presentation

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9/26/2017



9/26/2017

Sewer System Characterization Report Update

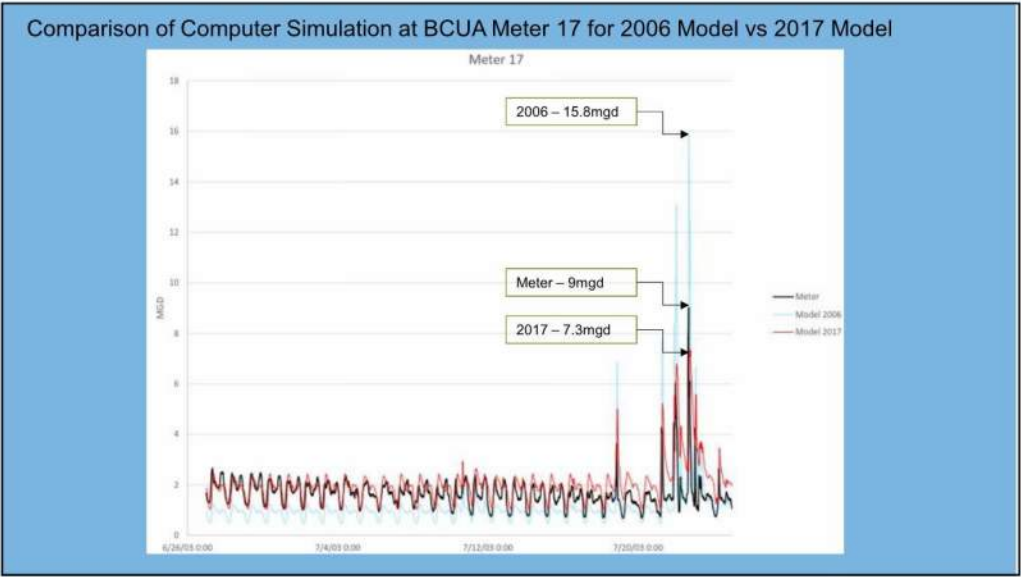
Info Works Computer Model Update



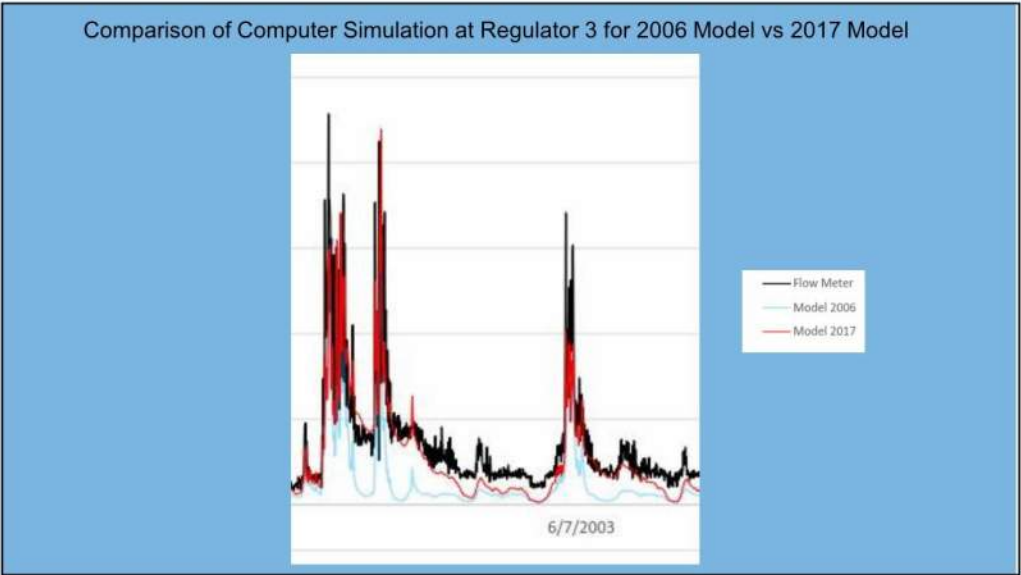
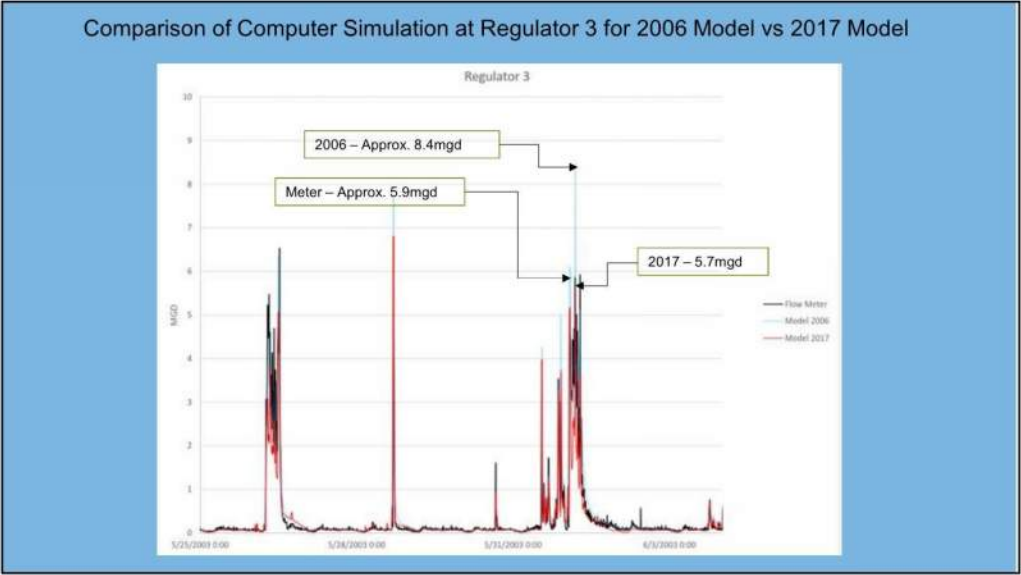
9/11/2017 Meeting No. 2 | Presentation

Is the Updated Model for Ridgefield Park any Better?

Let's Look!



9/26/2017



9/26/2017

Sewer System Characterization Report Update
Info Works Computer Model Update



Is the Updated Model for
Ridgefield Park any Better?

YES!

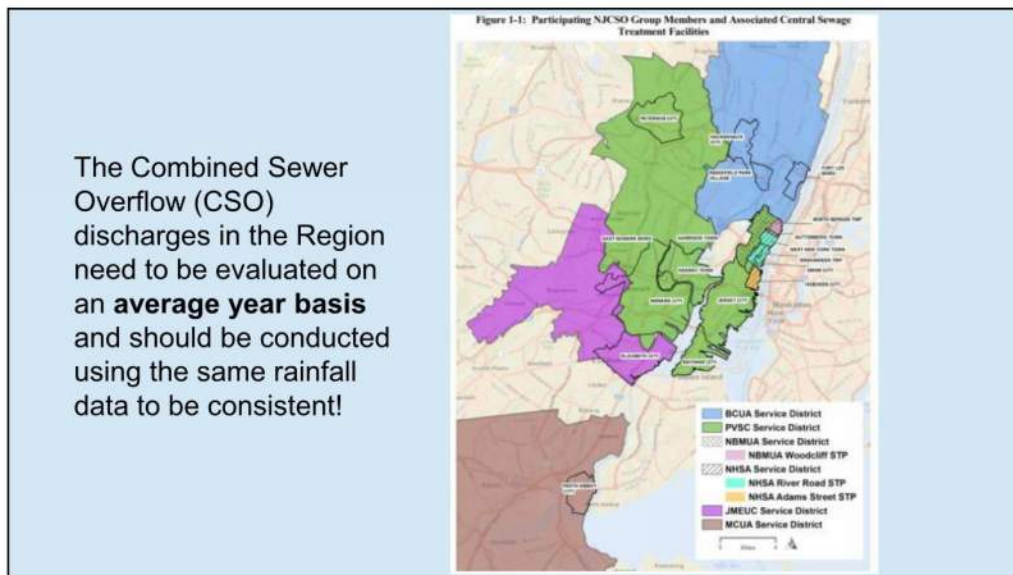
9/11/2017 Meeting No. 2 | Presentation 23

Typical Hydraulic Year Analysis and Report

We need to Establish
Average Precipitation
Characteristics for Use in
the Analysis of Alternatives

9/11/2017 Meeting No. 2 | Presentation 24

9/26/2017



Typical Hydraulic Year Analysis and Report

1. What is a typical hydraulic year?
 - Average/typical Annual Rainfall Volume
 - Average/typical Storm Intensities
 - Average/typical Peak Rainfall Volume per Storm
2. Why is It important?
 - Permit Requires no more than an average of four overflows per year, or
 - 85% capture of CSO Volume on an average basis.
3. How is it determined?
 - Analysis of Historic Rainfall data.

9/11/2017

Meeting No. 2 | Presentation

26

9/26/2017

Typical Hydraulic Year Analysis and Report

Rainfall in New Jersey / New York Region
is Highly Variable!

9/11/2017

Meeting No. 2 | Presentation

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Typical Hydraulic Year Analysis and Report

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1996	5.24	2.34	4.40	5.03	2.59	5.06	5.27	2.39	6.05	6.92	2.31	6.57	58.07
1997	3.50	2.19	5.19	3.05	3.12	2.42	7.05	2.59	2.20	2.02	4.54	4.16	42.35
1998	4.93	4.77	4.14	6.17	6.52	5.98	1.34	3.20	2.72	1.81	0.96	1.03	43.47
1999	6.57	3.10	3.83	1.90	4.19	0.41	1.01	5.51	5.35	2.90	2.90	2.90	44.75
2000	3.39	1.60	3.43	3.57	5.66	3.42	6.90	4.73	4.56	0.94	2.71	3.42	43.35
2001	2.57	1.79	8.89	1.71	2.85	3.97	2.25	1.97	4.28	0.46	0.81	2.01	31.44
2002	1.55	0.52	3.59	3.76	3.89	5.95	1.19	4.05	3.66	6.79	4.45	3.71	43.17
2003	2.94	3.90	3.95	2.42	3.45	10.30	2.59	5.21	5.57	3.72	3.94	5.11	56.33
2004	1.89	2.44	3.07	4.55	4.60	2.95	5.39	3.70	3.01	0.38	4.21	3.37	43.37
2005	3.93	2.21	4.18	3.42	1.21	2.98	4.05	0.51	3.36	3.74	3.05	44.14	Lowest
2006	4.52	2.35	0.79	4.05	3.35	5.99	6.71	2.52	3.35	6.75	6.95	2.19	56.16
2007	3.50	1.43	3.93	11.05	1.67	5.24	6.71	7.32	1.81	3.70	2.35	4.79	54.49
2008	2.30	5.82	3.51	2.70	3.95	5.63	3.14	2.60	7.14	2.79	3.07	5.05	49.53
2009	2.06	0.55	1.61	4.01	4.05	7.96	6.60	4.14	1.73	3.43	1.20	7.13	47.93
2010	1.66	5.45	10.05	2.90	3.45	2.37	1.93	2.44	5.05	3.94	1.53	3.05	43.47
2011	4.40	3.49	5.54	5.56	4.72	2.74	2.04	19.79	3.55	4.21	3.55	4.21	69.91
2012	2.89	1.33	1.05	3.45	4.32	5.02	2.27	2.56	3.13	3.85	1.62	5.06	36.35
2013	2.49	3.55	3.00	1.47	5.44	5.74	3.74	4.57	1.54	0.51	2.97	4.52	42.94
2014	2.75	4.94	3.00	7.35	4.03	4.41	5.10	1.76	1.52	4.15	4.13	4.91	49.33
2015	4.42	2.05	4.63	1.67	4.63	5.90	2.88	1.40	2.33	3.35	1.30	4.40	38.95
2016	4.01	4.04	1.35	1.12	3.85	2.40	0.08	0.93	2.17	3.90	0.52	2.91	35.41

Rainfall is Highly Variable

Newark Airport – 1996 to 2015

Lowest

Lowest

Highest

Highest

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Typical Hydraulic Year Analysis and Report

Rainfall in New Jersey / New York Region
is Highly Variable!

Conduct a Statistical Analysis of Rainfall

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Typical Hydraulic Year Analysis and Report

The Analysis is Being Undertaken by PVSC
For the New Jersey CSO Group

Analysis as Presented hereafter is taken from
the Draft Report (August 2017)

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Typical Hydraulic Year Analysis and Report

Rainfall in the Region is typically based on Long Term (100+ years) Records from Newark International Airport, but for what period?

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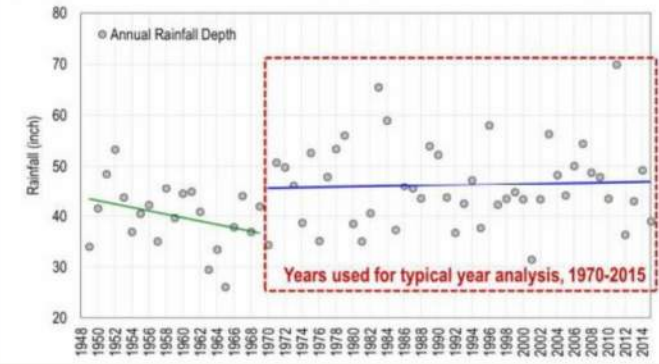
Typical Hydraulic Year Analysis and Report

Tables and Figures are from PVSC Draft Report

PVSC's Consultant reviewed the Period from 1948 to 2014 initially.

Selected Period from 1970 - 2014

Figure 1-2: Historical Annual Precipitation at Newark Liberty International Airport



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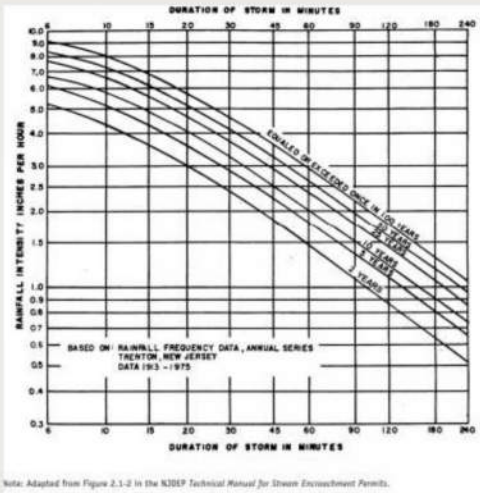
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Typical Hydraulic Year Analysis and Report

Rainfall Can Be Analyzed to Illustrate a Certain Pattern Known as the **Return Period** based on Duration of the Storm in Minutes and the Rainfall Intensity Measured in Inches per Hour.

Return Period : The Probability of Having a Storm Equal to or Greater Than that in any one Year.



Note: Adapted from Figure 2.3-2 in the NIDEP Technical Manual for Stream Encroachment Permits.

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Typical Hydraulic Year Analysis and Report

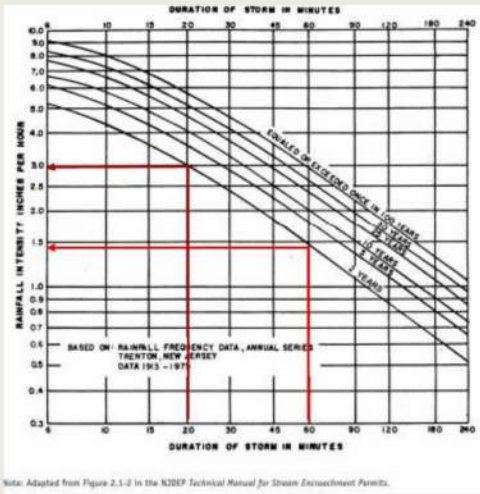
For Example: A 2 year storm has a probability of $\frac{1}{2}$ or 50% in any one year.

But 2 Years Storms Can Be Very Different

A Storm that has Rainfall Intensity of around 1.45 inches/hr. for 60 minutes is called a 2 Year Storm.

A Storm that has Rainfall Intensity of around 3.0 inches/hr. for 20 minutes is also called a 2 Year Storm.

Each has a 50% Probability of Occurring in any one year.



Note: Adapted from Figure 2.3-2 in the NIDEP Technical Manual for Stream Encroachment Permits.

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Typical Hydraulic Year Analysis and Report

Tables and Figures are
from PVSC Draft Report

Table 1-3: Partial Duration Series (PDS) - Based Precipitation Frequency Estimates with
90% Confidence Intervals (in inches) for Newark WSO Airport
(Source: NOAA Precipitation Frequency Data Server)

Duration	Average recurrence interval (years)					
	1	2	5	10	25	50
5-min	0.332 (0.304-0.365)	0.396 (0.363-0.435)	0.469 (0.429-0.516)	0.522 (0.476-0.573)	0.59 (0.536-0.647)	0.636 (0.575-0.698)
10-min	0.529 (0.484-0.580)	0.633 (0.580-0.695)	0.75 (0.685-0.824)	0.834 (0.759-0.915)	0.935 (0.848-1.03)	1.01 (0.909-1.11)
15-min	0.66 (0.604-0.724)	0.793 (0.726-0.870)	0.946 (0.863-1.04)	1.05 (0.957-1.15)	1.18 (1.07-1.30)	1.27 (1.15-1.40)
30-min	0.903 (0.827-0.991)	1.09 (1.00-1.20)	1.34 (1.22-1.47)	1.52 (1.38-1.67)	1.74 (1.58-1.91)	1.91 (1.72-2.09)
60-min	1.12 (1.03-1.23)	1.37 (1.25-1.50)	1.71 (1.56-1.88)	1.97 (1.80-2.16)	2.31 (2.10-2.54)	2.58 (2.33-2.83)
2-hr	1.38 (1.26-1.52)	1.68 (1.53-1.85)	2.13 (1.93-2.35)	2.47 (2.24-2.73)	2.96 (2.66-3.26)	3.35 (3.00-3.69)
3-hr	1.54 (1.40-1.69)	1.87 (1.71-2.06)	2.37 (2.16-2.61)	2.76 (2.51-3.04)	3.3 (2.99-3.63)	3.75 (3.36-4.12)
6-hr	1.98 (1.81-2.16)	2.4 (2.20-2.64)	3.03 (2.77-3.33)	3.55 (3.22-3.88)	4.28 (3.85-4.68)	4.88 (4.37-5.34)
12-hr	2.43 (2.22-2.67)	2.95 (2.70-3.24)	3.75 (3.42-4.11)	4.41 (4.01-4.83)	5.39 (4.85-5.87)	6.22 (5.56-6.76)
24-hr	2.72 (2.52-2.96)	3.3 (3.06-3.58)	4.23 (3.91-4.59)	5.02 (4.63-5.44)	6.21 (5.69-6.72)	7.25 (6.59-7.83)

Various
Return Periods
to characterize
storms from
1970 - 2014

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Typical Hydraulic Year Analysis and Report

What Impacts CSO Discharge Volume?

- Rainfall Volume (inches of rainfall)
- Peak Rainfall Intensity (inches per hour)
- The Size of the Drainage Area
(time of concentration)
- Frequency of Rainfall (When did it last rain?)

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Typical Hydraulic Year Analysis and Report

Tables and Figures are
from PVSC Draft Report

PVSC's
Consultant
Setup the
Variables that
needed to be
Considered and
Gave Each a
Weighing Factor

Table 1-2: Typical Hydrologic Year Ranking Parameters

Criteria Parameter	Description / Importance	Weighing Factor
Annual rainfall depth	Impacting total overflow volume and storage volume	10%
Rainfall, May 15-Sep 15	Rainfall during Recreational Season, May 15-Sep 15	5%
Passaic River Flow, May 15-Sep 15	River flow during Recreational Season, May 15-Sep 15	5%
Ratio (Passaic River Flow)/(Rainfall), May 15-Sep 15	Impacts waterbody dilution factor	10%
5 th largest storm	Determining max storage volume or WWTP capacity	15%
Rainfall volume for 85% captured	Determining max storage volume or WWTP capacity	15%
# of events with rainfall depth ≥ 0.2 in	Rainfall depth to trigger overflow in existing system	5%
# of back-to-back rainfall events	Determining antecedent conditions and potential storage facility operation	15%
Maximum peak intensities of the 5 th largest storm and less	Determining the sizing of conveyance pipes, diversions, regulators, pumps, etc.	15%
# of storms with return frequency ≥ 1 -year	Extremely large storms to be avoided	5%

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Typical Hydraulic Year Analysis and Report

To Be Conservative PVSC's Consultant
Eliminated any Year Where the Total Rainfall
was less than the Average of 46.3 inches



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Typical Hydraulic Year Analysis and Report

Tables and Figures are
from PVSC Draft Report

PVSC's
Consultant
determined the
top 5 years
based on the
results of the
analysis.

Table 2-3: Top 5 Ranked Years

Rank	Year	Score	Demonstration Approach				Presumption		Operational			
			Annual Rainfall (in)	Rainfall (in) May 15 - Sep 15	River Avg. Flow (cfs) May 15 - Sep 15	Ratio Rainfall / River, May 15 - Sep 15	5th Largest Storm (in)	Rainfall Volume for 85% Captur ed (in)	# of Events >0.2" Rainfall Depth	# of back- to- back events	Maximum Peak Intensity of 5th Largest & Smaller	# of Storms with Return Freq > 1-yr
1	2004	0.100	48.4	19.9	850	42.8	1.63	1.21	54	5	0.99	3
2	2008	0.130	48.8	18.5	504	27.3	1.84	1.37	49	6	0.77	3
3	2009	0.161	47.9	19.8	1,140	57.5	1.87	1.16	54	6	0.80	1
4	1996	0.165	58.1	18.6	770	41.4	2.00	1.32	63	7	1.09	3
5	2014	0.186	49.3	14.8	686	46.3	1.56	1.26	60	8	1.26	2
Average 1970-2015			46.3	16.7	779	43.7	1.72	1.38	51	5.6	0.90	2

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Typical Hydraulic Year Analysis and Report

How do you Verify that 2004 is Equal To (required)
or Greater Than (Conservative) an Average Year?

- Run Your Computer Model with all
Rainfalls for an extended period.
- Separate the Results (Number of
Overflows and Overflow Volume) by Years.
- Determine the Average Number of
Overflows and the Average Annual
Overflow Volume
- Compare that to 2004

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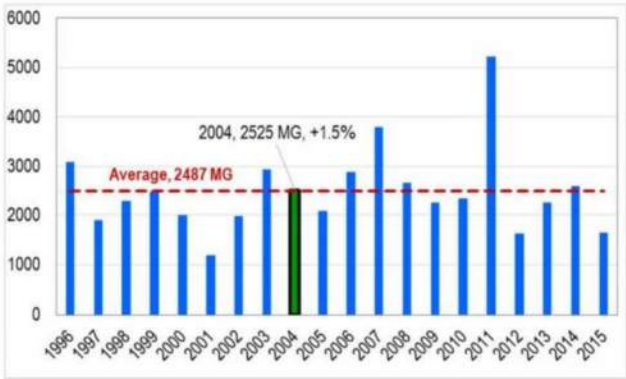
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Typical Hydraulic Year Analysis and Report

Tables and Figures are from PVSC Draft Report

Figure 2-2: Hydrologic and Hydraulic Model - CSO Volume



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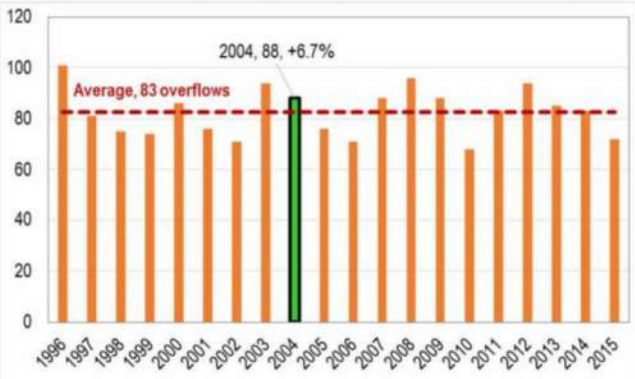
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Typical Hydraulic Year Analysis and Report

Tables and Figures are from PVSC Draft Report

Figure 2-3: Hydrologic and Hydraulic Model - Number of CSO Events



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Typical Hydraulic Year Analysis and Report

How does it Compare to Average Conditions?

Tables and Figures are from PVSC Draft Report

Table 2-5: Summary of the Recommended Typical Year - 2004

Parameters		2004
Rank		Top 1
Annual Rainfall		48.37 in (4.5% greater than average 46.27)
Extreme Storm		1 Year Storm (2) 2 Year Storm (1)
Back-to-Back Storm Events		5 (11% less than average 5.6)
May 15 through Sep 15	Rainfall	19.9 in (19% greater than average 16.7)
	Passaic River Flow	850 cfs (9% greater than average 779)
	Ratio, River Flow / Rainfall	42.8 (2% less than average 43.7)
Modeled Annual CSO Volume		2,525 MG (1.5% greater than average 2,487)
Modeled Annual Overflow Frequency		88 (6.7% greater than average 83)

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Typical Hydraulic Year Analysis and Report

PVSC's Consultant Has Completed the Draft and Is Recommending 2004 as the Typical Year.

- Currently Under Review by Individual Municipalities
- Needs to Be Submitted and Approved by NJDEP



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Project Schedule

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BCUA CSO Group Project Schedule

Reports with Deadline of July 1, 2018:

- Quarterly Reports to NJDEP
- Submit Regional System Characterization Report
 - Develop Template for Report (BCUA)
 - Coordinate Model Integration (BCUA)
 - Finalize Individual Reports – Target: March 1, 2018
 - Finalize Regional Report – Target: June 1, 2017
- Submit Public Participation Report
- Submit Compliance Monitoring Program Report*
- Submit Consideration of Sensitive Areas Plan

* New Jersey CSO Group Joint Effort

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Ridgefield Park Project Schedule

Deadlines After July 1, 2018:

- Quarterly Reports to NJDEP
- Submit Development and Evaluation of Alternatives Report (July 1, 2019)
- Submit Selection and Implementation of Alternatives Report in Final Regional LTCP (June 1, 2020)

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Questions?

September 19, 2017

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Thank you

- BCUA CSO Group
- Supplemental CSO Team –
Meeting 2: System Characterization



September 19, 2017

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Sewer System Characterization Report Update

Description and Status

In Most CSO Municipalities:

- Land Use Has Not Changed.
- Population Has Not Changed.
- Sewer System Has Not Changed.

But computer models are old and no longer supported. New computer models will be used and therefore models need to be updated.

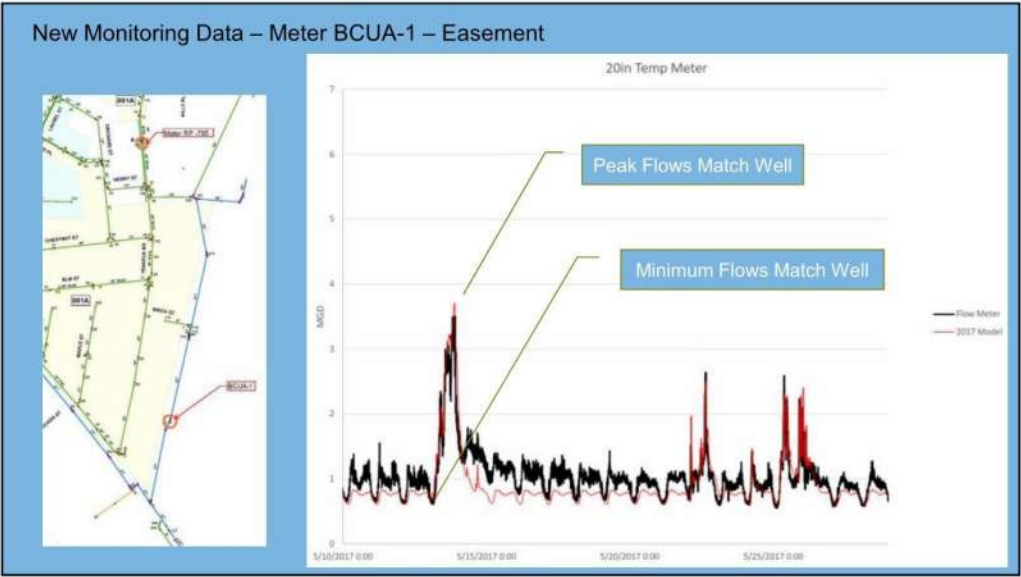


September 19, 2017

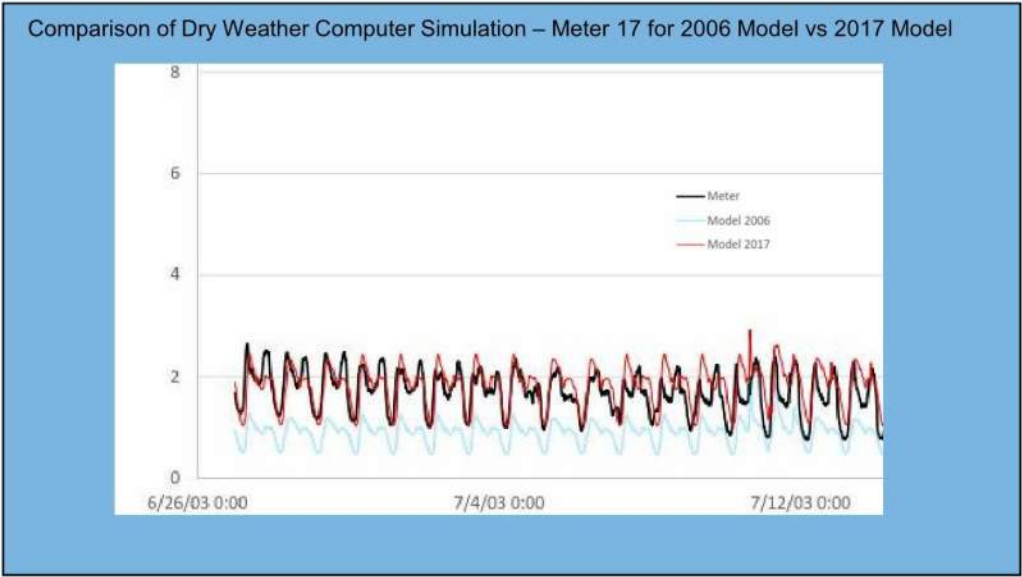
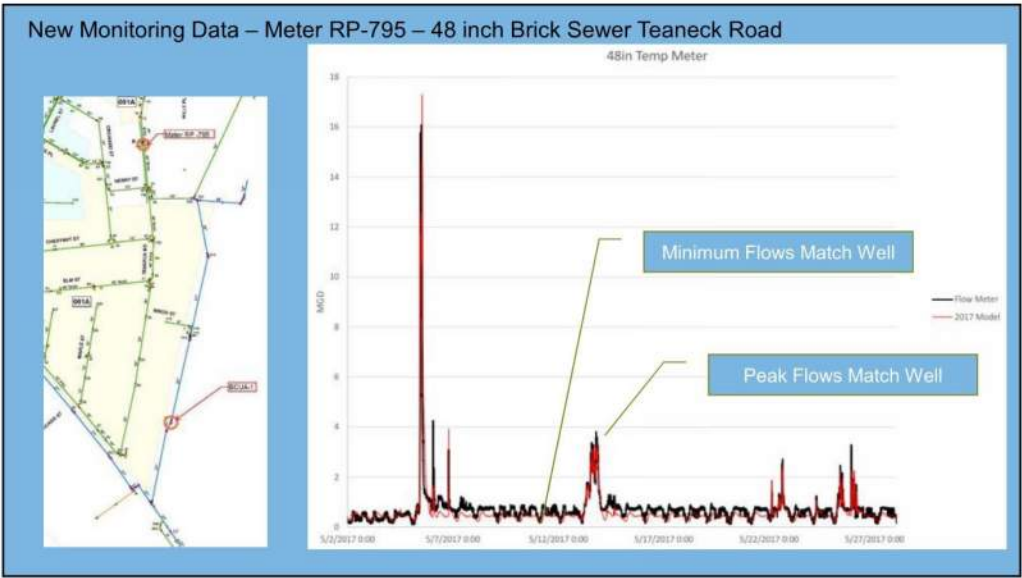
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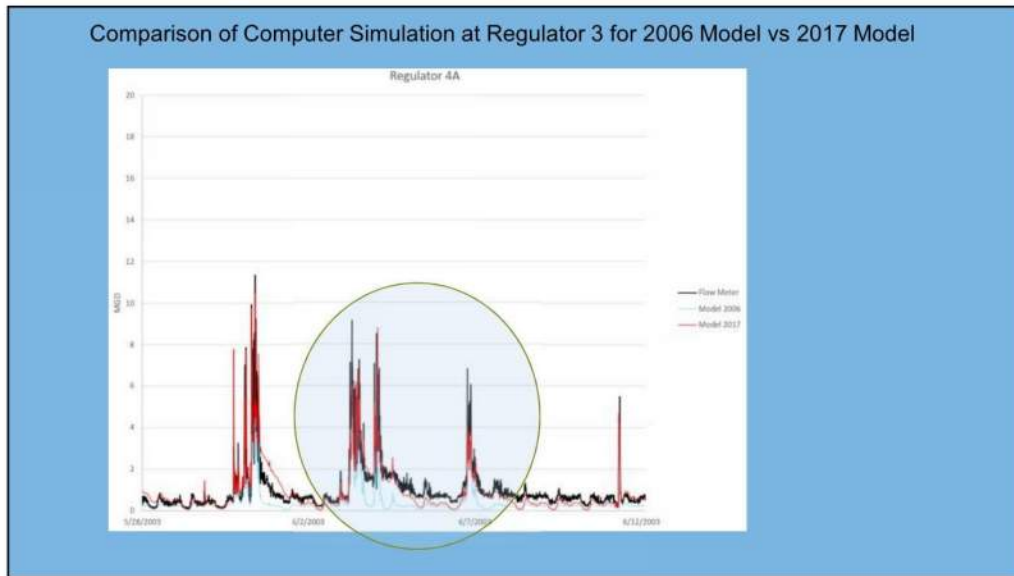
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Appendix C. December 12, 2017 – Green infrastructure

Bergen County Utilities Authority

Supplemental CSO Team

Meeting Number 3

BCUA Administration Building, Public Meeting Room

December 12, 2017, 9:00 AM

Group Meeting Minutes

1) Introduction

John Denning opened the meeting at 9 AM with a safety minute about the importance of being cautious when installing holiday decorations.

2) Presentation (see power point slides)

- a) Link to EPA Green Infrastructure Website referenced in the presentation –
<https://www.epa.gov/green-infrastructure/learn-about-green-infrastructure>

3) Discussion and Questions

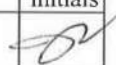











- a) Dominic DiSalvo discussed the BCUA rain barrel program.
- b) Can we provide details about planters, such as sizing, diagrams, links to websites, etc? Yes, however these details will be developed later in the program. Mott MacDonald will provide more information as it is developed.
- c) Members of the group would like the opportunity to meet with representatives from the DEP to discuss ways that residents can earn credits for their efforts. For example:
 - i) What percent permeable would permeable pavement be considered?
 - ii) Is a green roof still considered impervious area as far as zoning?
The NJDEP representatives present and Mott MacDonald indicated they would work together to see if a meeting could be set up.
- d) Captain Bill urged the group to lobby the legislature to pass the Stormwater Utility Bill in order to obtain funding for the maintenance and installation of green infrastructure.
- e) Mark Olson asked if pervious pavement would work on sloped parking lots. The group discussed the possibility to using check dams, tanks or French drains to slow the water flow.
- f) The group discussed that planning boards will need to understand the true cost of development and change their mindset. If Stormwater Utility Legislation is passed landowners could be charged for the amount of impervious area on their property. Perhaps they (land use boards) can offer future credits to developers to implement green infrastructure as part of their development to offset future stormwater charges. They discussed Millburn, where residents must install dry wells whenever they expand their coverage.
- g) There was a discussion that town are allowed to implement requirements stricter than those listed in the NJDEP model stormwater ordinance. Examples like Millburn were discussed, where residents must install dry wells whenever they expand their coverage.

- h) Capt. Bill asked if redevelopment areas are exempt from new requirements. Towns are, in fact, allowed to require green infrastructure beyond zoning requirements.
- i) Mark Olson discussed the program in PA where residents can register their rain gardens and receive feedback on how much water they captured.
- j) The DEP representatives discussed the DEP Watershed Ambassador Program and its *Build your own Rain Barrel* initiative. They mentioned that transportation of the supplies is the main challenge of this program. Each barrel would also require about \$15 worth of fixtures.
- k) Capt. Bill referenced a presentation by Stan Cach of the NJDEP, and raised the option of using End of Pipe technology to reduce the impact of water flowing into the surface waters and suggested getting Stan Cach at one of the meetings to discuss the CSO Pilot Study recently completed in Bayonne. It was noted that green technology is only part of the solution. The rest of the overflow will have to be treated or captured. It was determined that Stan or perhaps MM would cover this project is a future meeting.
- l) The Public Participation Report was discussed. It was noted that we need to establish with the NJDEP what they are expecting to be included in the report. The group would like to see a draft of the report prior to the deadline. At the January meeting with the DEP, requirements for the report will be discussed. All activities completed by the members will be included in the report.

Meeting concluded at 11:10 AM

Minutes submitted by: Donna Gregory

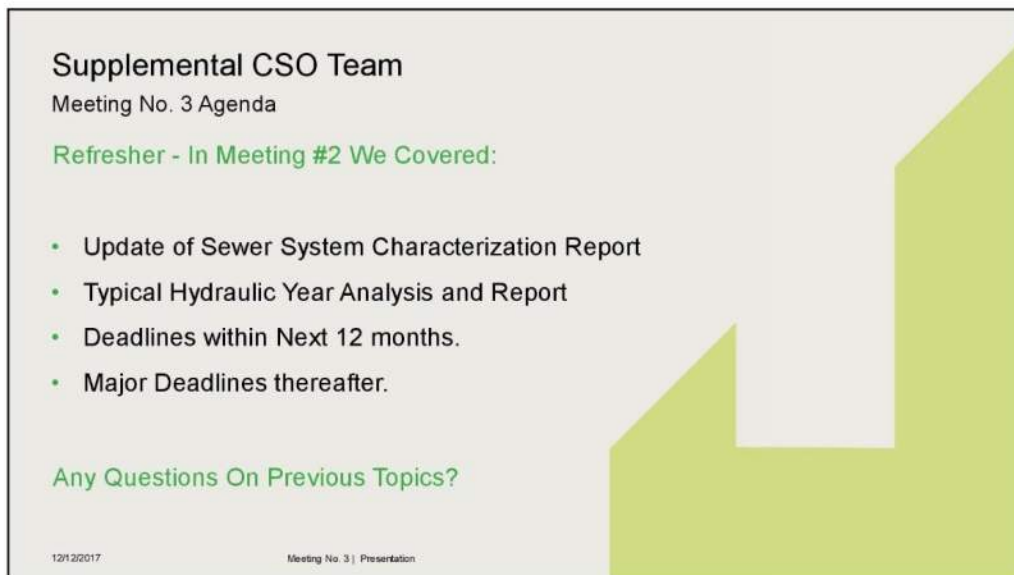
Bergen County Utilities Authority
Supplemental CSO Team
Meeting Number 3
BCUA Administration Building, Public Meeting Room
December 12, 2017, 9 – 10:30 am

Name	Organization	Email	initials
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Gary Grog	1102 F+ Lee	gary.grog@hdc.nj.gov	
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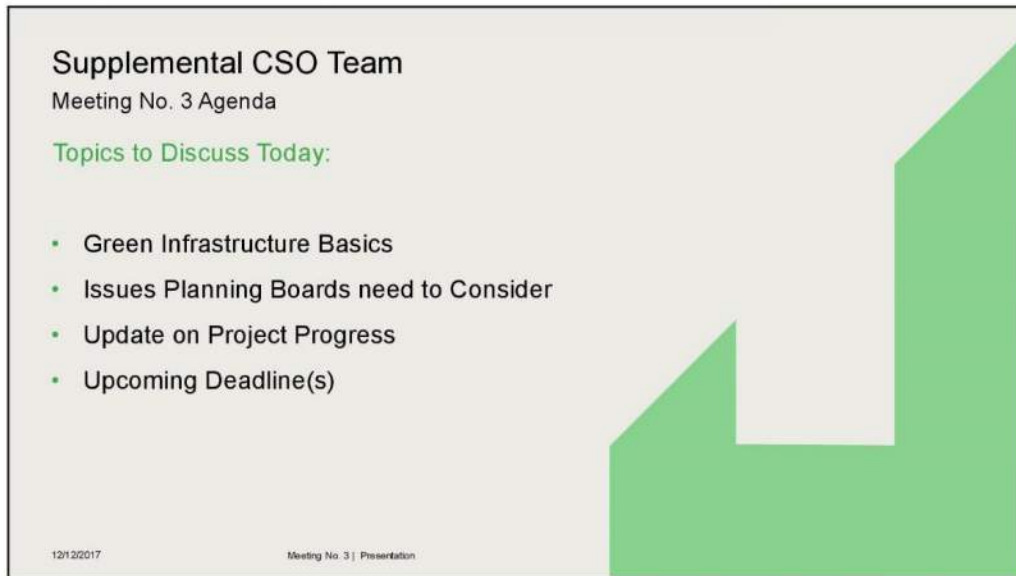
Bergen County Utilities Authority
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Name	Organization	Email	initials
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Bob Applebaum	Borough of Fort Lee	Bappelbaum@aol.com	
Jan Goldberg	Borough of Fort Lee	j-goldberg@fortleenj.org	
Captain Bill Sheehan	Hackensack Riverkeeper	captain@hackensackriverkeeper.org	
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Liz Law	DEP	Elizabeth.Law@DEP.NJ.gov	
Katie Ribsam	DEP	Katie.ribsam@dep.nj.gov	
Jennifer Feltis	Cortese NJ DEP	jennifer.feltis@dep.nj.gov	

6/25/2018



6/25/2018



Supplemental CSO Team

Meeting No. 3 Agenda

Topics to Discuss Today:

- Green Infrastructure Basics
- Issues Planning Boards need to Consider
- Update on Project Progress
- Upcoming Deadline(s)

12/12/2017 Meeting No. 3 | Presentation



Green Infrastructure Basics

Description

Presentation is taken from USEPA website.

Learn more by going to:

<https://www.epa.gov/green-infrastructure/learn-about-green-infrastructure>

12/12/2017 Meeting No. 3 | Presentation

6/25/2018

Green Infrastructure Basics

Description

What is Green Infrastructure?

According to EPA: Green infrastructure is a cost-effective, resilient approach to managing wet weather impacts that provides many community benefits. While single-purpose gray stormwater infrastructure—conventional piped drainage and water treatment systems—is designed to move urban stormwater away from the built environment, green infrastructure reduces and treats stormwater at its source while delivering environmental, social, and economic benefits.

12/12/2017

Meeting No. 3 | Presentation

Green Infrastructure Basics

Description

What is Green Infrastructure?

Changes the Way Stormwater Runoff is Handled from common methods of transport and discharge, including:

- Use it
- Store it, or
- Slow it Down

In a way that can be economical and/or beneficial to the community.

12/12/2017

Meeting No. 3 | Presentation


6/25/2018

Green Infrastructure Basics

Description

What is Green Infrastructure?

- [Downspout Disconnection](#)
- [Rainwater Harvesting](#)
- [Rain Gardens](#)
- [Planter Boxes](#)
- [Bioswales](#)
- [Permeable Pavements](#)
- [Green Streets and Alleys](#)
- [Green Parking](#)
- [Green Roofs](#)
- [Urban Tree Canopy](#)
- [Land Conservation](#)



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Green Infrastructure Basics

Examples

Downspout Disconnection

Reroute rooftop drains from curb drains or service laterals in combined sewers areas to dry wells, cisterns, or permeable areas.



Water from the roof flows from this disconnected downspout into the ground through a filter of pebbles.

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Green Infrastructure Basics


Description

Downspout Disconnection

Only works where roof leaders and downspouts are currently directed to service connection and combined sewer system.

Caution:

- a. Water cannot be directed to a neighbor
- b. Do not direct water across a sidewalk (freeze potential).
- c. Does your soil perc?
- d. Check your local ordinances.



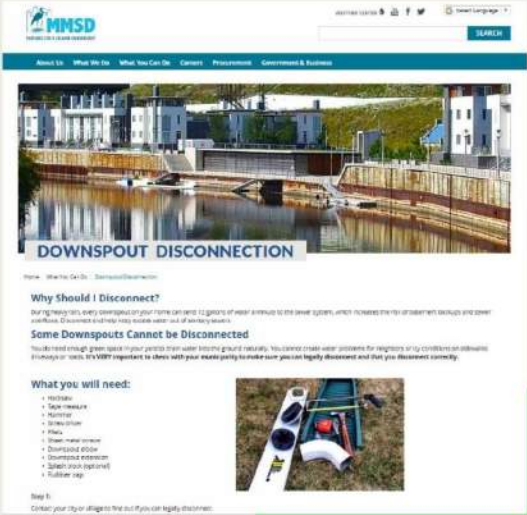
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Green Infrastructure Basics

Example

Milwaukee Downspout Disconnection Program



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Green Infrastructure Basics

Description

Rainwater Harvesting

Collect and Store Rainwater for Later Use on Landscaping or Gardens, i.e. rain barrels, or larger storage tanks. Particularly valuable in arid regions with limited water supplies.



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Green Infrastructure Basics

Description

Rainwater Harvesting

Limitations:

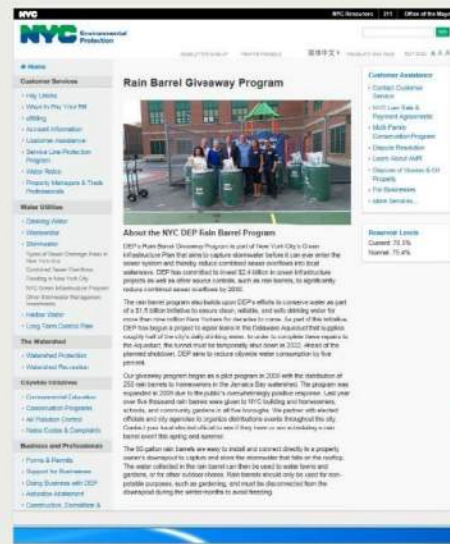
- Size of Container
- Only reuse during growing season.
- Manual maintenance needed to keep barrel empty to maximum harvesting.



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New York City Rain Barrel Giveaway Program



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Rain Gardens

As per EPA, Rain gardens are versatile features that can be installed in almost any unpaved space. Also known as bioretention, or bioinfiltration, cells, they are shallow, vegetated basins that collect and absorb runoff from rooftops, sidewalks, and streets.



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Green Infrastructure Basics

Description

Rain Gardens

Limitation:

- Needs permeable non-paved areas

Advantage:

Mimics natural hydrology of infiltration, evaporation, and transpiration.

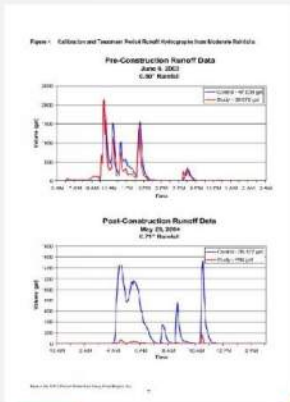
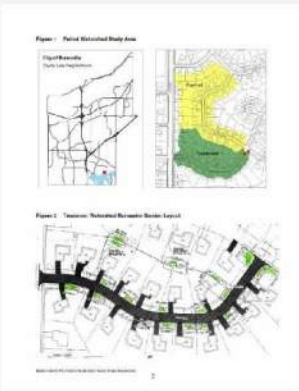
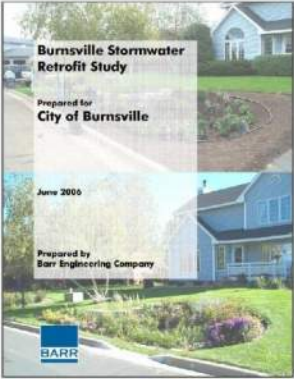


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Green Infrastructure Basics

Rain Gardens - Minnesota



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Green Infrastructure Basics

Description

Planter Boxes

As per EPA, Planter boxes are urban rain gardens with vertical walls and either open or closed bottoms. They collect and absorb runoff from sidewalks, parking lots, and streets and are ideal for space-limited sites in dense urban areas and as a streetscaping element.



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Green Infrastructure Basics

Description

Planter Boxes

Limitation:

Needs permeable non-paved areas and thus a decent right-of-way width between curbs and buildings.

Advantage:

Mimics natural hydrology of infiltration, evaporation, and transpiration.



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Philadelphia
Green
Infrastructure
Program



Meeting No. 3 | Presentation

Bioswales

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Green Infrastructure Basics

Description

Bioswales

Limitation:

Needs permeable non-paved areas and thus a decent right-of-way width between curbs and buildings.

Advantage:

Mimics natural hydrology of infiltration, evaporation, and transpiration.



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Green Infrastructure Basics

Description

Permeable Pavements

As per EPA, Permeable pavements infiltrate, treat, and/or store rainwater where it falls. They can be made of pervious concrete, porous asphalt, or permeable interlocking pavers.



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Green Infrastructure Basics

Description

Permeable Pavements

Limitation:
Needs permeable subsoils or high void volume subbase.
Require higher maintenance to limit plugging.

Advantage: Could be cost effective in areas with high land values and flooding or icing problems.



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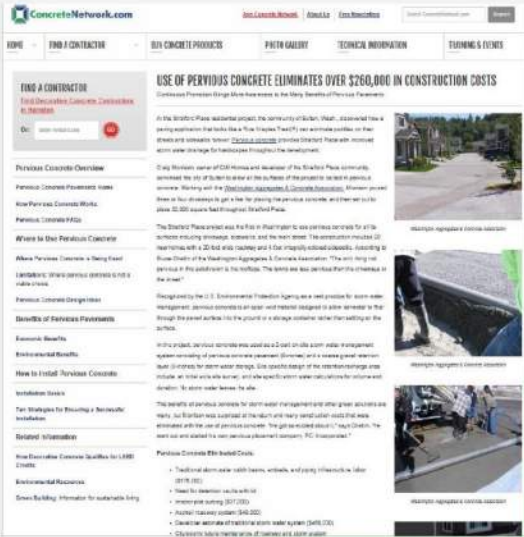
Green Infrastructure Basics

Example

Permeable Pavements

Sultan, Washington

Straford Place Community Residential Project



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Green Infrastructure Basics

Description

Green Streets and Alleys

As per EPA, "Green streets and alleys are created by integrating green infrastructure elements into their design to store, infiltrate, and evapotranspire stormwater. Permeable pavement, bioswales, planter boxes, and trees are among the elements that can be woven into street or alley design



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Green Infrastructure Basics

Description

Green Streets and Alleys

EPA Region 3 Green Streets, Green Jobs, and Green Towns (G3) Program is meant to provide guidance with:

- Policy, Regulations, and Incentives
- Planning and Design
- Construction, Operation, and Maintenance
- Financing and Economic Benefits
- Green Jobs and Training



<https://www.epa.gov/G3>

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Green Infrastructure Basics

Example

Green Streets and Alleys

**Syracuse, NY
Green Street Project**

FACT SHEET
Green Street: Concord Place

Project Description: Concord Place is the first "green street" project in Syracuse. This project demonstrates a viable approach to managing stormwater by the installation of infiltration practices along the street corridor. Stormwater enters the system through the existing storm drain connections in the street, instead of the collected water flowing to the sewer system, as has previously been the case. The water is directed to an underground trench drain with a stone base. As the water enters the trench, it slowly flows through the compacted sand bed and soil, eventually releasing into the ground below. In addition to this underground infiltration system, Concord Place also received a new and paved application to the street surface, which was paid for by the City of Syracuse.

This type of project is unique among green infrastructure projects – although above the surface it appears to be a traditional street/parking project, below the street/parking structure was modified to more effectively manage stormwater and protect our water resources.

The completion of the restoration of Concord Place is the first of several planned "green street" projects within the "Save the Rain" program.

Save the Rain Program City of Syracuse (www.syracuse.gov)	Project: Concord Place City Technology: Infiltration Bed Project Location: Concord Place West, Syracuse City Center Project Owner: City of Syracuse Developer: City of Syracuse Curbcut Area: 1,000 square ft Year of Installation: 2014 Year Completed: 2014 Contact Person: Jeff Pappas Phone Number: 315-435-3333
--	---

CONCEPTUAL DESIGN DRAWING

Standard asphalt road with subsurface infiltration bed

CONSTRUCTION OF UNDERGROUND DIFFUSION TRENCH AT CONCORD PLACE

Green Infrastructure Basics

Description

Green Parking

Use of permeable pavements can be installed in sections of a lot (parking spaces) and rain gardens and bioswales can be included in medians and along the parking lot perimeter.



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Green Infrastructure Basics

Description

Green Parking

Wilmington, MA

Silver Lake Beach Parking Lot

Key Results and Conclusions:

- Infiltration tests of the permeable paving materials, conducted after construction, indicated that infiltration rates met or exceeded specifications; the average observed infiltration rates were:

Permeable Asphalt	Permeable Pavers	Flexi-Pave	Grasspave
65 in./hr.	40 in./hr.	1,492 in./hr.	exceeds 8,000 in./hr.

- Results of JSCS monitoring show no indication of groundwater impairment beneath the areas with permeable paving.
- Reports from the town board of health show no closures of the swimming beach as a result of *e. coli* bacteria in the four years following installation of the .3D features. For eight years prior to installation, beach closures due to *E. coli* occurred one or more times each summer.
- Since the installation of the .3D features, the beach had one closure due to cyanobacteria, an algal bloom often associated with influx of nutrients.

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The screenshot shows the official website of the Massachusetts Department of Energy and Environmental Affairs. The page is titled 'Demonstration 3: Permeable Paving Materials and Bioretention in a Parking Lot'. It features a large photograph of a parking lot with permeable paving materials and bioretention areas. The page includes a navigation menu with links to various departments and a sidebar with additional information. The footer of the page displays the 'dcr' logo.

Green Infrastructure Basics

Description

Green Roofs

As per EPA, Green roofs are covered with growing media and vegetation that enable rainfall infiltration and evapotranspiration of stored water. They are particularly cost-effective in dense urban areas where land values are high and on large industrial or office buildings where stormwater management costs are likely to be high.

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The image shows a green roof on a building in a dense urban area. The roof is covered with a layer of green vegetation, including various plants and grasses. The building is a multi-story structure with a red roof. In the background, other tall buildings are visible, indicating a city center or downtown area.

Hill Country Community Development Report		Source: Community Development
Junior Center, Seattle, WA		
accommodation		
<p>The hotel's parking garage consists of an open lot with 120 parking spaces for guests and 100 spaces for staff. Guest accommodations include 100 single rooms, 100 double rooms, and 100 triple rooms. The hotel is a 10-story building with a modern design. The hotel is a 10-story building with a modern design. The hotel is a 10-story building with a modern design.</p>		
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A photograph of a tree-lined street. The street is paved and runs straight into the distance. On both sides of the street, there are large, mature trees with green and yellowing leaves, suggesting autumn. A car is visible in the distance on the street. The scene is bright and sunny, with light filtering through the trees.


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Green Infrastructure Basics


Example – Tree Canopy

Philadelphia Water Department



Stormwater Tree Trench

A stormwater tree trench is a system of trees that are connected to an underground collection structure. On the surface, a stormwater tree trench looks like a series of trees along a street. Below the sidewalk, there is an underground system of pipes that collect runoff from the street and carry it to a water treatment facility. Stormwater tree trenches are a type of green infrastructure that can help reduce runoff and improve water quality. They are also a great way to add trees to a city and improve the urban environment.




GREEN STREETS: STORMWATER TREE TRENCH

Stormwater tree trenches are a type of green infrastructure that can help reduce runoff and improve water quality. They are also a great way to add trees to a city and improve the urban environment.

Stormwater Tree Trench at West Mill Creek

Runoff from the street and sidewalk is diverted into a stormwater tree trench at the intersection of Lupton and Marney Streets in West Philadelphia through modified inlet structures. Trees are planted in pockets of soil within a continuous trench that stores stormwater and it can infiltrate. Porous pavers replace the hard sidewalk over the trench and allow runoff from the sidewalk to infiltrate into the trench. The continuous trench also provides the tree roots with water access to air and water.




Location

Watershed
Schuylkill

Airflow
Lupton and Marney Street, Philadelphia, PA

Neighborhood
Mill Creek - Parkside



Lead Agency
Philadelphia Water Department


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Green Infrastructure Basics

Description

Land Conservation

The water quality and flooding impacts of urban stormwater also can be addressed by protecting open spaces and sensitive natural areas within and adjacent to a city. Natural areas that should be a focus of this effort include riparian areas, wetlands, and steep hillsides.



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Issues Planning Boards Need to Consider
Description

The typical cry by municipalities is:

Ratables, Ratables, Ratables.

Ratable – Liable to assessment; taxable.

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Issues Planning Boards Need to Consider
Description

Many Local Land Use Ordinances have been established to maximize

Ratables, Ratables, Ratables.

by limiting open space or maximum impervious cover requirements.

Typical Comment: We don't want to change the character of our municipality.

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Issues Planning Boards Need to Consider

Description

[illegible]

96 Attachment 4:1

06-01-2014

12/12/2017

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Issues Planning Boards Need to Consider

Description

The Problem is:

Runoff is directly related to percent impervious.

$$\text{Flow} = \text{Area} \times \text{rainfall intensity} \times \text{runoff factor (\% impervious)}$$

The higher the percent impervious the greater the peak flow and volume. The higher the peak flow and volume the more we need to capture or treatment, increasing the overall costs of CSO Controls.

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Issues Planning Boards Need to Consider

Description

Potential solutions – Change Zoning Ordinances to:

- Reduce the maximum building coverage
- Reduce the maximum impermeable area
- Require onsite runoff storage to reduce peak flows
- Require permeable pavements
- Require more green infrastructure
- Require more open space

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BCUA CSO Group Project Schedule Update

12/12/2017

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BCUA CSO Group Project Status Report

Reports with Deadline of July 1, 2018:

- Quarterly Reports to NJDEP ([current](#))
- Submit Regional System Characterization Report
 - Develop Template for Report (BCUA) ([completed – under review](#))
 - Coordinate Model Integration (BCUA) ([underway](#))
 - Draft Ridgefield Park Report – March 1, 2018
- Submit Public Participation Report
- Submit Compliance Monitoring Program Report* ([draft under review](#))
- Submit Consideration of Sensitive Areas Plan

* New Jersey CSO Group Joint Effort

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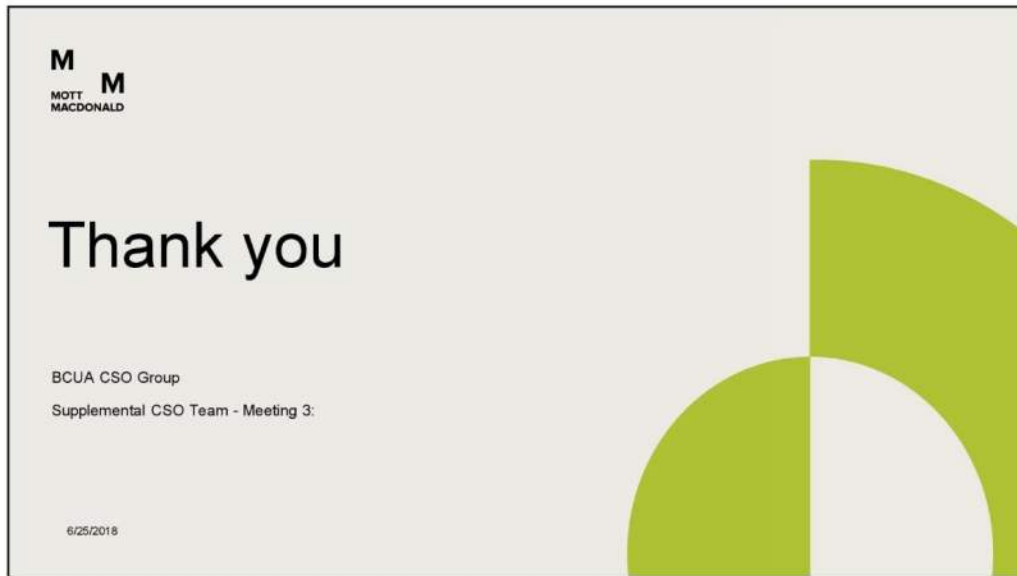
Questions?

12/12/2017

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Appendix D. April 10, 2018 – Sensitive Areas, Typical Year Analysis

Bergen County Utilities Authority CSO Group

Supplemental CSO Team

BCUA Administration Building

April 10, 10:00 – 11:00 am

Minutes

1. Presentation of Sensitive Area Analysis
 - a. What Are Sensitive Areas
 - b. Sensitive Area Analysis for
 - i. Ridgefield Park
 - ii. Fort Lee
 - iii. Hackensack
2. Presentation/Update on Typical Year Analysis
3. Presentation/Update on Permit Schedule
4. Question and Answer Period:
 - a. BCUA Chairman Ron Phillips questioned as to what municipalities are doing to control wet weather flows from separate sanitary sewer areas into the BCUA System.

It was noted to Chairman Phillips that while there has been some partial sewer separation had been undertaken by Ridgefield Park and potentially others, in general only the roadway runoff has been diverted into municipal storm sewer systems and thus these areas are not truly separated.

It was also noted to Chairman Phillips that the NJDEP has issued permits to all municipalities that own and operate MS4s (municipal storm sewer systems) that will be requiring additional work in the future to control the amount of wet weather that is entering the sewer systems tributary to BCUA.

5. Meeting was adjourned at approximated 12:00 noon.

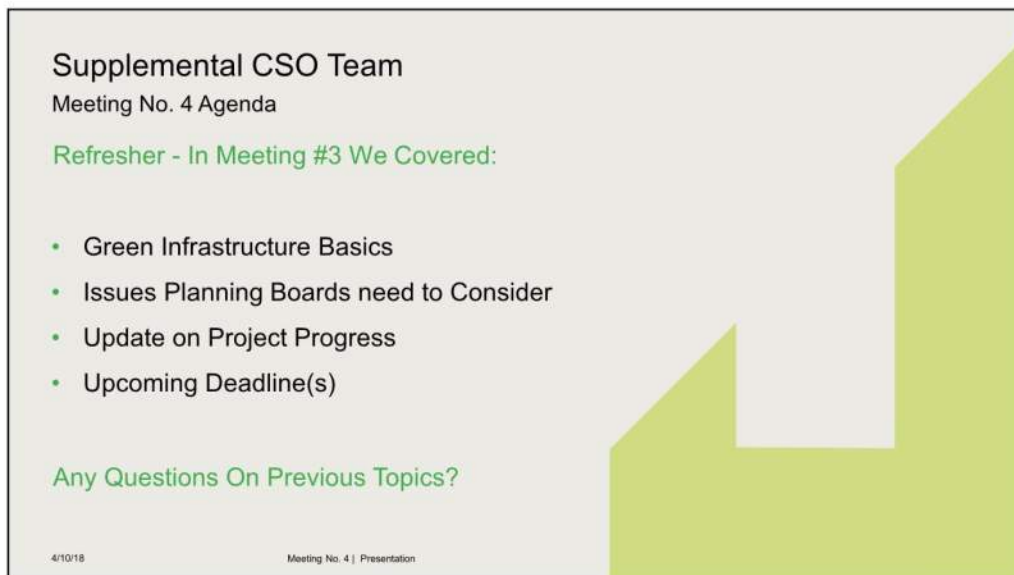
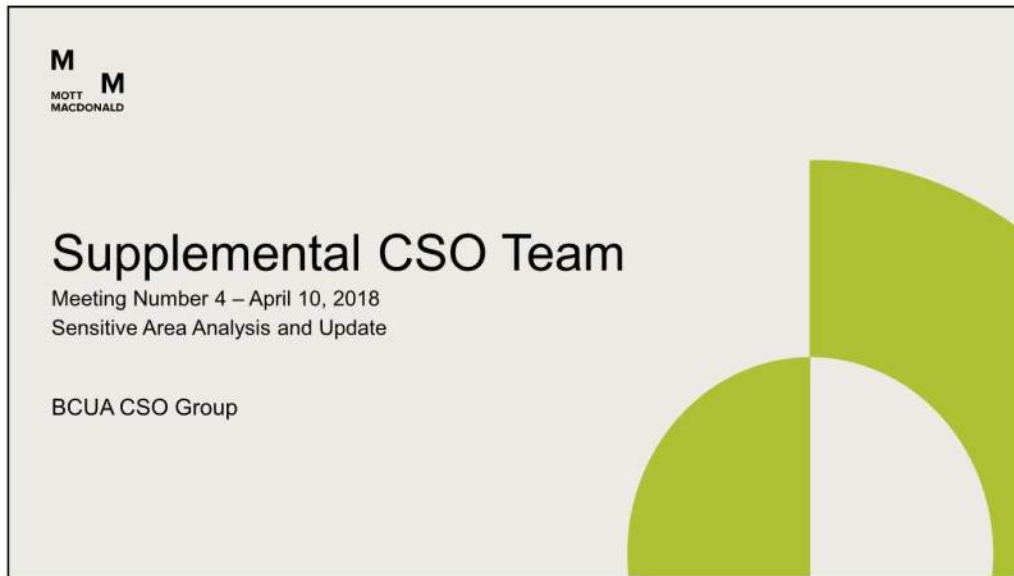
Bergen County Utilities Authority CSO Group
Supplemental CSO Team
BCUA Administration Building
April 10, 10:00 – 11:00 am

Name	Organization	Email	initials
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Bergen County Utilities Authority CSO Group
Supplemental CSO Team
BCUA Administration Building
April 10, 10:00 – 11:00 am

Name	Organization	Email	initials
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Ron Phillips	BCUA		R
Michele Langa	Hackensack Riverkeeper	legal@hackensackriverkeeper.org	M

5/29/2018



5/29/2018

Supplemental CSO Team

Meeting No. 4 Agenda

Topics to Discuss Today:

- Consideration of Sensitive Areas
 - Village of Ridgefield Park
 - Borough of Fort Lee
 - City of Hackensack
- Update on Typical Year Analysis
- Update on BCUA Computer Model
- Update on Sewer System Characterization Report

4/10/18

Meeting No. 4 | Presentation

Consideration of Sensitive Areas

Description

Required in Individual NJPDES Permits for Permittees with CSO Outfalls:

Borough of Fort Lee – NJPDES Permit No. NJ 0034517

City of Hackensack – NJPDES Permit No. NJ 0108766

Village of Ridgefield Park – NJPDES Permit No. NJ 0109118

Individual Permits can be found on NJDEP Website:

<http://www.nj.gov/dep/dwq/cso.htm>

4/10/18

Meeting No. 4 | Presentation

5/29/2018

Consideration of Sensitive Areas

Description

Requirement:

- Evaluate the Existence and Location of Sensitive Areas in Relation to CSO Discharges (Source: NJ-GeoWeb)
<http://www.nj.gov/dep/gis/geoweb splash.htm>
- The Long Term Control Plan (LTCP) shall:
 - ✓ Prohibit new or significantly increase CSOs in Sensitive Areas
 - ✓ Eliminate or relocate CSOs that discharge to sensitive areas, where possible and economically achievable.
 - ✓ Where overflows cannot be moved or eliminate – provide the level of treatment necessary to meet Water Quality Standards

4/10/18

Meeting No. 4 | Presentation

Consideration of Sensitive Areas

Description

What are Sensitive Areas?

- Designated Outstanding National Resource Waters;
- National Marine Sanctuaries;
- Waters with Threatened or Endangered Species and their Habitat;
- Waters Used for Primary Contact Recreation;
- Public Drinking Water Intakes; and
- Shellfish Beds

4/10/18

Meeting No. 4 | Presentation

5/29/2018

Sensitive Areas For Village of Ridgefield Park

4/10/18

Meeting No. 4 | Presentation

Consideration of Sensitive Areas

Outstanding National Resource Waters

What are Outstanding National Resource Waters (ONRW)?

- Designation of ONRW are made by individual states.
- Waters are to be set aside for posterity because of their unique significance.
- The NJDEP cannot approve any activity which might alter existing water quality in these waters.
- Include NJ surface waters designated as FW1 and PL.
- Includes approximately 67 river sections in New Jersey

4/10/18

Meeting No. 4 | Presentation

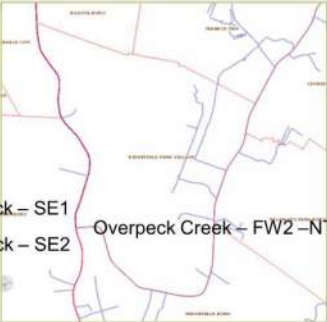
5/29/2018

Consideration of Sensitive Areas

Outstanding National Resource Waters

Water Quality of Waters Surrounding Ridgefield Park

There are no Outstanding National Resource Waters in or around Ridgefield Park.



Hackensack – SE1
Hackensack – SE2
Overpeck Creek – FW2 –NT /SE2

4/10/18

Meeting No. 4 | Presentation

5


Consideration of Sensitive Areas

National Marine Sanctuaries

The National Marine Sanctuaries Act (NMSA) was enacted in 1972 in order to protect significant marine habitats and special ocean areas


Northeast

Thunder Bay




Atlas Map
Information Sheet Download

Stellwagen Bank



Atlas Map
Information Sheet Download

Monitor



Atlas Map
Information Sheet Download

There are no National Marine Sanctuaries in the Region.
The closest location is Stellwagen Bank, off the coast of Massachusetts.


4/10/18

Meeting No. 4 | Presentation

5/29/2018

Consideration of Sensitive Areas

Waters with Threatened or Endangered Species and Their Habitat



SBH - Piedmont Plains - Landscape Project

- Rank 1 - Habitat specific requirements
- LNDR
- Rank 2 - Special Concern
- Rank 3 - State Threatened
- Rank 4 - State Endangered
- Rank 5 - Federal Listed

Waters Surrounding Ridgefield Park are ranked:
Rank 4 – Bald Eagle
Rank 3 – Yellow-Crowned Night Heron
Rank 2 – Brown Thrasher, Glossy Ibis, Snowy Egret, and Blue Heron

According to NJDEP these species are not critically dependent on the water for survival.

4/10/18 Meeting No. 4 | Presentation

Consideration of Sensitive Areas

Primary Contact Recreation Waters

Primary Contact Recreation Waters includes, but may not be limited to those waters where the public under the following activities:


- Wading in Water
- Swimming
- Water Skiing
- Diving
- Tubing
- Surfing
- Kayaking
- Canoeing
- Rafting

4/10/18 Meeting No. 4 | Presentation

5/29/2018

Consideration of Sensitive Areas

Primary Contact Recreation Waters



Waterfront Park is Used by the Wanda Canoe Club to launch Canoes and Kayaks

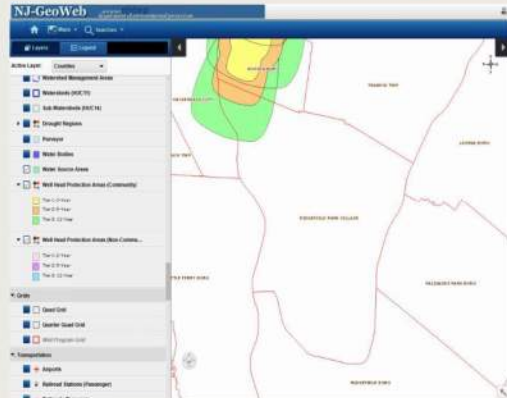
There are no other know Primary Contact Areas in and around Ridgefield Park.

4/10/18

Meeting No. 4 | Presentation

Consideration of Sensitive Areas

Public Drinking Water Intakes or Their Designed Protection Areas

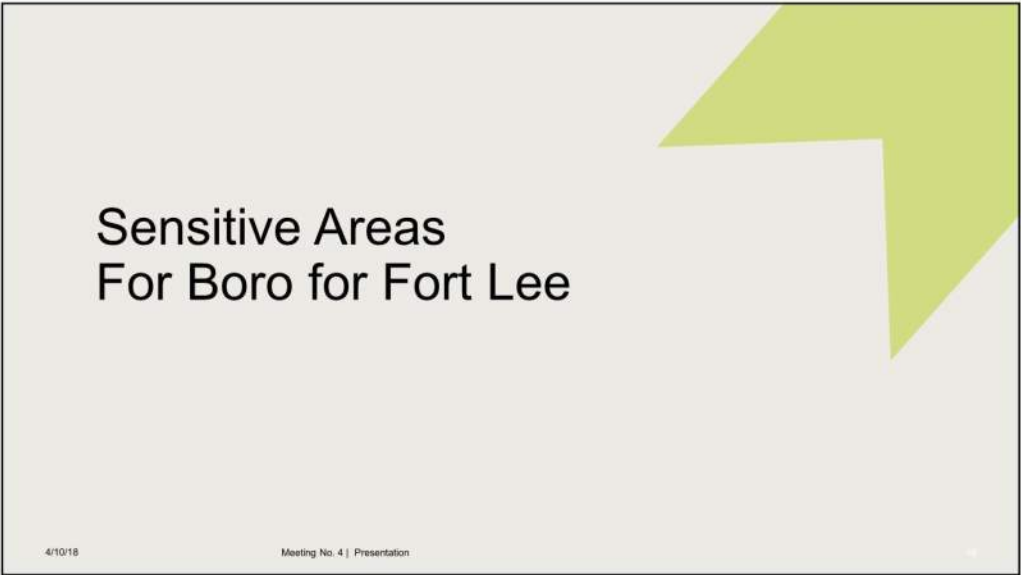
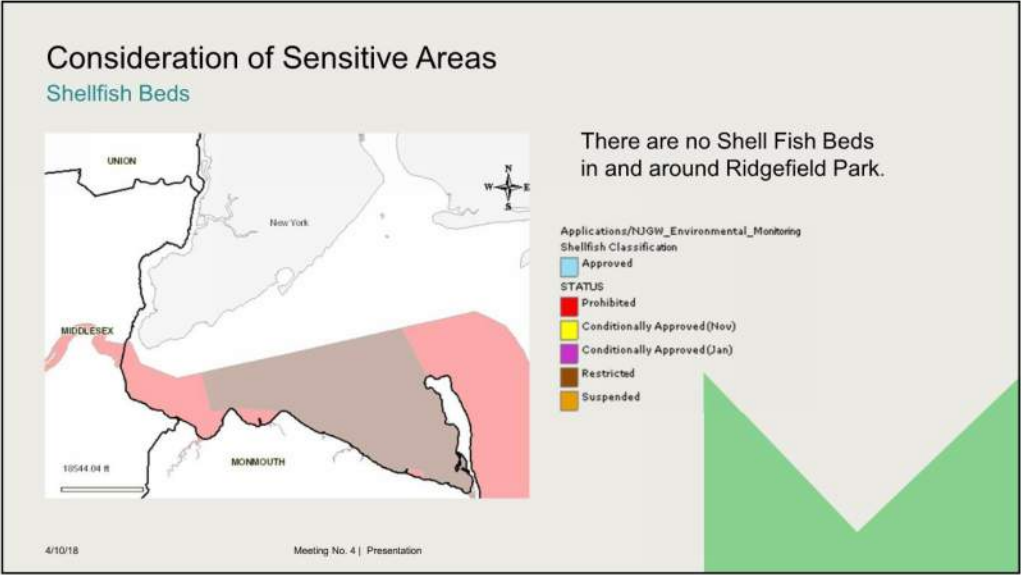


There are no Public Water Drinking Inlets in an around Ridgefield Park, however there is a public well in Bogota Boro, who's wellhead protection area extends into Ridgefield Park.

4/10/18

Meeting No. 4 | Presentation

5/29/2018



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Data Sources Used or Sensitive Areas

1 Outstanding National Resource Waters

No water supply
Wetlands on map from NJDEP GIS database
<http://www.nj.gov/dep/gis/listall.html>
<https://www.fws.gov/wetlands/data/Mapper.html>

2 National Marine Sanctuaries

<https://sanctuaries.noaa.gov/about/maps.html>

3 Threatened or Endangered Species and their Habitat

<https://ecos.fws.gov/ecp/report/table/critical-habitat.html>
<https://ecos.fws.gov/ipac/>
<https://nidep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7>

4 Shellfish Beds

<http://www.nj.gov/dep/gis/listall.html>

4/10/18

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Fort Lee Sensitive Areas

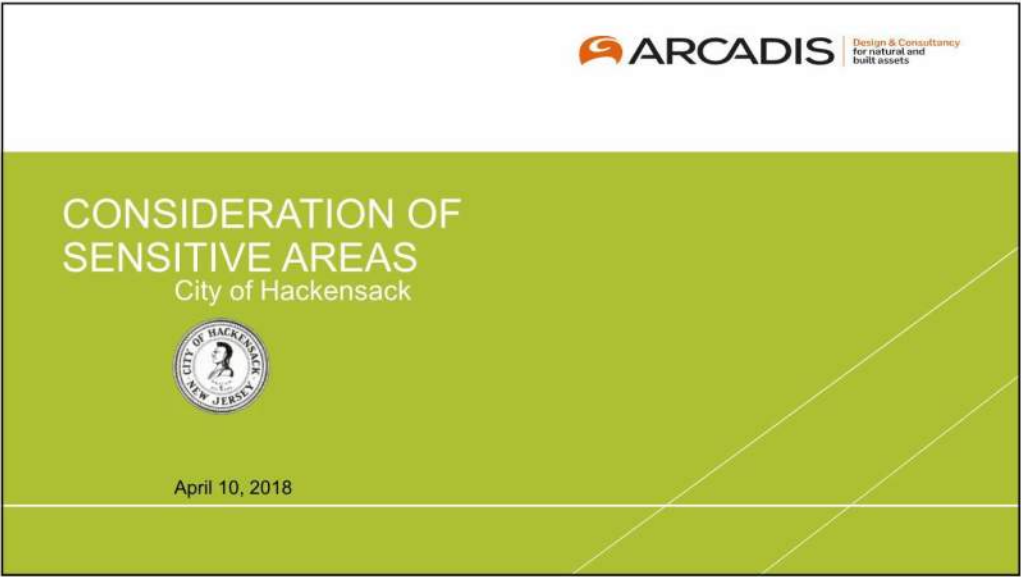
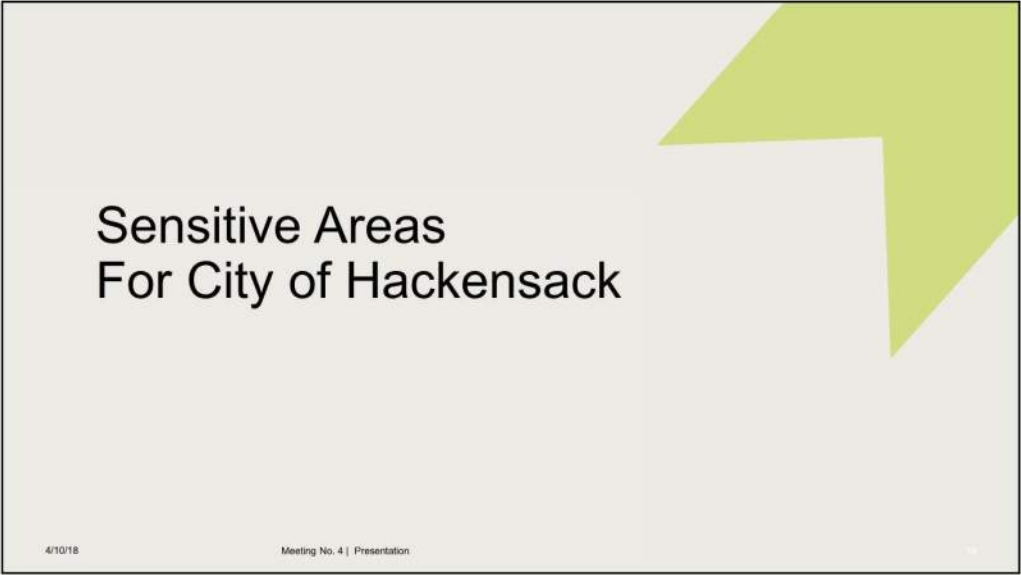
The map displays the Fort Lee area with various sensitive regions highlighted. A legend in the bottom right corner identifies three categories: 'NJPDES_Combined_Sewer_Overflows' represented by blue circles, 'nj_municipal' represented by a red outline, and '2012_Land_UseLand_Cover_Wetlands' represented by a green hatched pattern. The map also includes a scale bar (0.75, 1.5, 3 Miles) and a north arrow.

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Goals/Requirements

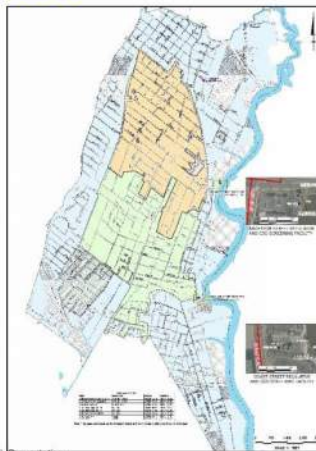
- Identify sensitive areas within the CSS:
 - Outstanding National Resource Waters
 - National Marine Sanctuaries
 - Waters with Threatened or Endangered Species
 - Primary Contact Recreational Waters
 - Drinking Water Intakes and their Protected Areas
 - Shellfish Beds
- Minimize overflows to sensitive areas and incorporate consideration of sensitive areas into city planning and development

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Hackensack CSS



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Outstanding National Resource Waters (ONRW)

- Surface Water Quality Standards (N.J.A.C. 7:9B) defined ONRW as Fresh Water 1 (FW1) or Pinelands (PL)
- No FW1 or PL in or near the City of Hackensack therefore further consideration is not necessary

National Marine Sanctuaries

- 15 national marine sanctuaries in the United States
- No sanctuaries in the Hackensack River and therefore further consideration is not necessary

4/10/18

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Threatened or Endangered Species

- Used Landscape Project Version 3.3 data for Piedmont Plains Region to identify habitats present in Hackensack
- Habitats ranked 1 – suitable habitat
- Habitats ranked 2 – one or more occurrences of special concern species: Snowy Egret
- Habitats ranked 4 – one or more occurrence of state endangered species: Bald Eagle, Snowy Egret



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5/29/2018

Primary Contact Recreational Waters

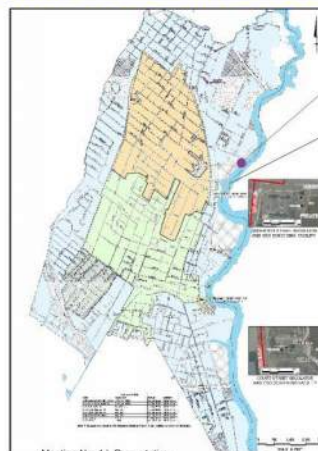
- According to NJAC 7:9B, Surface Water Quality Standards, Hackensack River and its tributaries near the City of Hackensack are classified as saline waters of estuaries, SE1
- SE1 is listed as a primary contact recreation water use
 - Primary contact recreation: water related recreational activities that involve significant ingestion risks and includes, but is not limited to wading, swimming, diving, surfing, and water skiing
- This will be further considered during the preparation of the LTCP.

4/10/18

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Potential Boat Launch Location



Potential boat launch location in Johnson Park

Anderson Street outfall



Potential boat launch location is approximately 1,300 feet upstream of Anderson Street Outfall

4/10/18

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5/29/2018

Drinking Water Intakes

- 2004 NJ Source Water Assessment Program reveals no drinking water intakes in the City of Hackensack
- None present near City of Hackensack based on preliminary review
- Will review Surface-water Source Water Areas geographic information available on NJ-GeoWeb

Figure 2: Source Water Assessment Areas for Public Water Supply Intakes



- Shellfish Beds**
- Further review of the Shellfish Growing Water Classification regulations (N.J.A.C. 7:12) indicates shellfish growing is prohibited in all waters north and west of the Raritan Bay; including the Hackensack River
- Further consideration is not necessary

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Summary

Area	Summary
Outstanding National Resource Waters	No FW1 or PL waters near the City of Hackensack. No further consideration required
National Marine Sanctuaries	No marine sanctuaries present. No further consideration required
Waters with Threatened or Endangered Species	Rankings of 1, 2 and 4 exist in the City of Hackensack and will be considered during the LTCP preparation
Primary Contact Recreational Waters	Primary contact recreation (SE1) will be considered during the LTCP preparation
Drinking Water Intakes and their Protected Areas	No intakes present based on preliminary review
Shellfish Beds	Shellfish growing is prohibited. No further consideration required

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Typical Hydraulic Year Analysis and Report Update

Table 2-3: Top 5 Ranked Years

Rank	Year	Score	Demonstration Approach				Presumption		Operational			
			Annual Rainfall (in)	Rainfall (in) May 15 - Sep 15	River Avg. Flow (cfs) May 15 - Sep 15	Ratio Rainfall / River May 15 - Sep 15	5th Largest Storm (in)	Rainfall Volume for 85% Captured (in)	# of Events >0.2" Rainfall Depth	# of back-to-back events	Maximum Peak Intensity of 5th Largest & Smaller	# of Storms with Return Freq > 1-yr
1	2004	0.100	48.4	19.9	850	42.8	1.63	1.21	54	5	0.99	3
2	2008	0.130	48.8	18.5	504	27.3	1.84	1.37	49	6	0.77	3
3	2009	0.161	47.9	19.8	1,140	57.5	1.87	1.16	54	6	0.80	1
4	1996	0.165	58.1	18.6	770	41.4	2.00	1.32	63	7	1.09	3
5	2014	0.186	49.3	14.8	686	46.3	1.56	1.26	60	8	1.26	2
Average 1970-2015			46.3	16.7	779	43.7	1.72	1.38	51	5.6	0.90	2

NJCSO Group picked 2004

NJDEP wants us to use 2008

We are still working with NJDEP on the issue, but the group has decided to stay with 2004!

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BCUA CSO Group Project Schedule Update

4/10/18

Meeting No. 4 | Presentation

5/29/2018

BCUA CSO Group Project Status Report

Reports with Deadline of July 1, 2018:

Submit Regional System Characterization Report

- Develop Template for Report (BCUA) (completed)
- Coordinate Model Integration (BCUA) (underway)
- Complete Model Dry Weather Calibration (completed)
- Complete Model Wet Weather Calibration (underway)
- Draft Report Being Prepared (underway)
- Final Report Review (Mid-May 2018)

4/10/18

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BCUA CSO Group Project Status Report

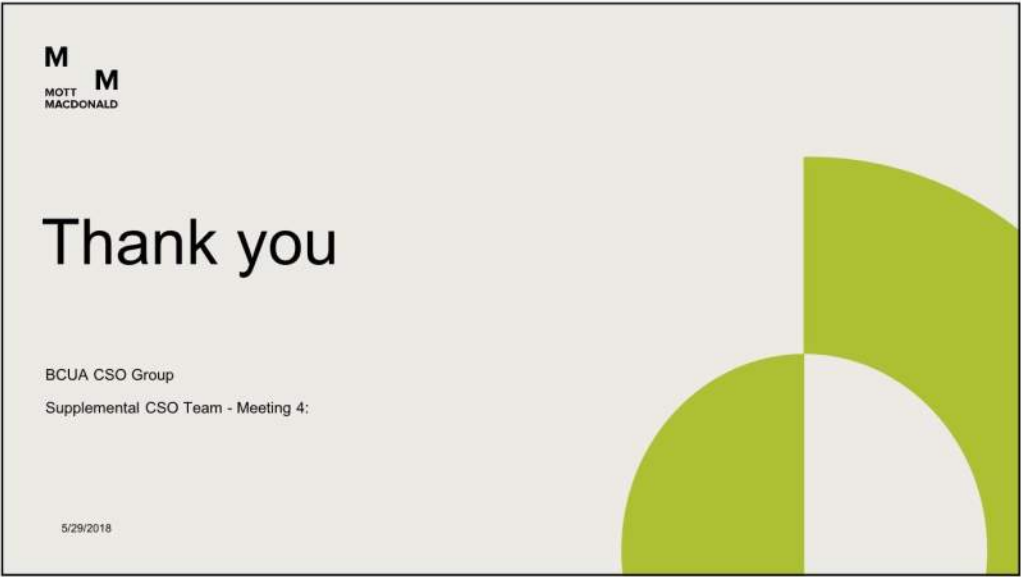
Reports with Deadline of July 1, 2018:

- Submit Public Participation Report
CSO Supplemental Team Report
(being drafted)
- Submit Compliance Monitoring Program Report* - New Jersey CSO Group Joint Effort
(draft under review)
- Submit Consideration of Sensitive Areas Plan
(To be included in Sewer System Characterization Report)

4/10/18

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5/29/2018



Appendix E. June 12, 2018 – Results of Sewer System Characterization Study and Report

Bergen County Utilities Authority

Supplemental CSO Team

Meeting #5

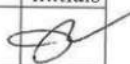




BCUA Administration Building, Public Meeting Room

June 12, 2018, 10:00 AM

- 1) Introduction
 - a) John Rolak opened the meeting at 10:00 AM with a review of topics discussed at the last quarterly meeting held in March and opened for questions. No questions were asked at that time about previous topics.
- 2) Presentation by John Rolak about the BCUA Sewer System Characterization Report, which is due on July 1, 2018 (see power points).
 - a) Presentation by David Stahl about the Fort Lee Sewer System Characterization Report (see power points).
 - b) Presentation by Frank Belardo about the Hackensack Sewer System Characterization Report (see power points).
 - c) Presentation by John Dening about the Ridgefield Park Sewer System Characterization Report (see power points).
 - d) Presentation by John Dening on various reports due on or before July 1, 2018.
- 3) Discussions on date for next CSO Supplemental Team meeting. Tentative date set for September 11, 2018.
- 4) Meeting concluded at 11:15 am.

Minutes submitted by Donna Gregory

Bergen County Utilities Authority
Supplemental CSO Team
Meeting Number 5
BCUA Administration Building, Public Meeting Room
June 12, 2018, 10:00 am

Name	Organization	Email	initials
John Rolak	Mott MacDonald	John.rolak@mottmac.com	
John Dening	Mott MacDonald	John.dening@mottmac.com	
Donna Gregory	Mott MacDonald	Donna.gregory@mottmac.com	
Susan McVeigh	Health Officer, Hackensack	smcveigh@hackensack.org	
Francis Reiner	Senior Urban Designer, LLA-PP	franciser@dmrarchitects.com	
Mark Olson	Chairman, Green Team	Mark-olson@verizon.net	
Stephen Quinn	Ridgefield Park Environmental Commission	stephencquinn@aol.com	
Bob Applebaum	Borough of Fort Lee	Bappelbaum@aol.com	
Jan Goldberg	Borough of Fort Lee	j-goldberg@fortleenj.org	
Captain Bill Sheehan	Hackensack Riverkeeper	captain@hackensackriverkeeper.org	
Michelle Langa	Hackensack Riverkeeper, attorney	legal@hackensackriverkeeper.org	
Wayne Vriesema	Hackensack Health Department	wvriesema@hackensack.org	
Alan O'Grady	Ridgefield Park	aog560@aol.com	
Del Bove, Mark	Arcadis	Mark.DelBove@arcadis.com	
Dominic DiSalvo	BCUA	ddisalvo@bcua.org	
Edward Mignone	Fort Lee	E-Mignone@fortleenj.org	
Gary Grey	HDR	Gary.Grey@hdrinc.com	
Robert Laux	BCUA	rlaux@BCUA.org	

Name	Organization	Email	initials
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David Stahl	HDR	David.Stahl@hdrinc.com	DS
FRANK BELARDO	ARCADIS	frank.belardo@arxadis	FB
LINDSAY KIRK	DME	LINDSAYK@DMEARCHITECTS.COM	LK
Ed Monroe	Ridgely Park	ed81563@gmail.com	EM
Alan O'Grady	R. P. DPW	A06560@Aoh.com	AO

6/25/2018



6/25/2018

Supplemental CSO Team
Meeting No. 5 Agenda

Topics to Discuss Today:

Baseline Compliance Monitoring Report

Sewer System Characterization Study

Modelling Results for:

- BCUA Trunk Sewer System
- Borough of Fort Lee
- City of Hackensack
- Village of Ridgely Park

06/12/2018 Meeting No. 5 | Presentation

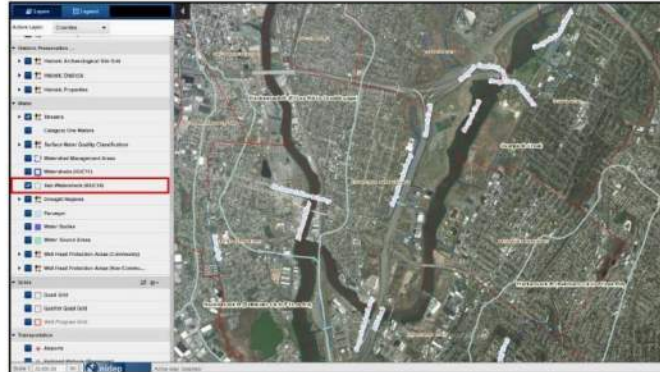
BCUA Sewer System Characterization / Modeling
Description

Baseline Compliance Monitoring Report

- Undertaken by NJ CSO Group
- Conducted Year Long Receiving Water Monitoring
- Undertaking Calibration and Verification of a Receiving Water Model
- Monitoring Results Being Presented for Area Waters
 - Hackensack River
 - Overpeck Creek
 - Hudson River

06/12/2018 Meeting No. 5 | Presentation

Overpeck Creek Sub-Watershed (HUC-14 02030103180040; Sub-watershed ID 058B04)
Hackensack River, Fort Lee Road to Oradell gage (HUC-14 02030103180030; Sub-watershed ID 058B03)

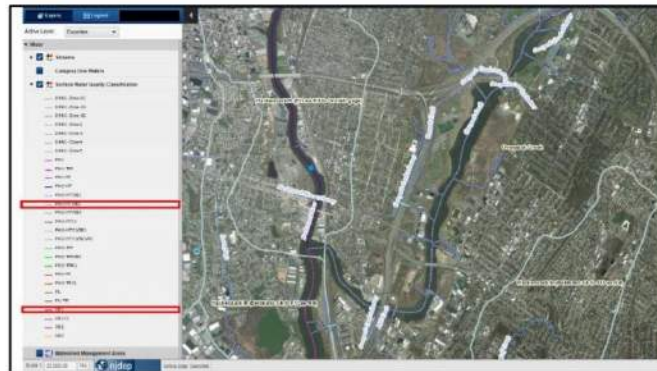


06/11/2018

Meeting No. 5 | Presentation

Receiving Waters

SE-1 and FW2-NT/SE2



06/11/2018

Meeting No. 5 | Presentation

6/25/2018

Receiving Waters

Sampling

Hackensack River Basin

- NJ/NY State Line to Oradell
- Oradell to Confluence with Overpeck Creek
- Overpeck Creek to Route 1-9 Bridge
- Route 1-9 Bridge to Newark Bay

FW2-NT (C1)

SE-1

SE-2

SE-3

Hudson River in Area of Fort Lee

SE-2

Class	Description	Bacterial Standards	Monthly Mean	Single Sample Max	Protected Uses
SC	Saline Ocean	Enterococci	35	104	Primary Contact, Shellfishing
SE1	Saline Estuary	Enterococci	35	104	Primary Contact
SE2	Saline Estuary	Fecal Coliform	770	NA	Secondary Contact
SE3	Saline Estuary	Fecal Coliform	1500	NA	Secondary Contact
FW2	Fresh Water	E. coli	126	235	Primary Contact and Public Water Supply

06/11/2018

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Receiving Waters

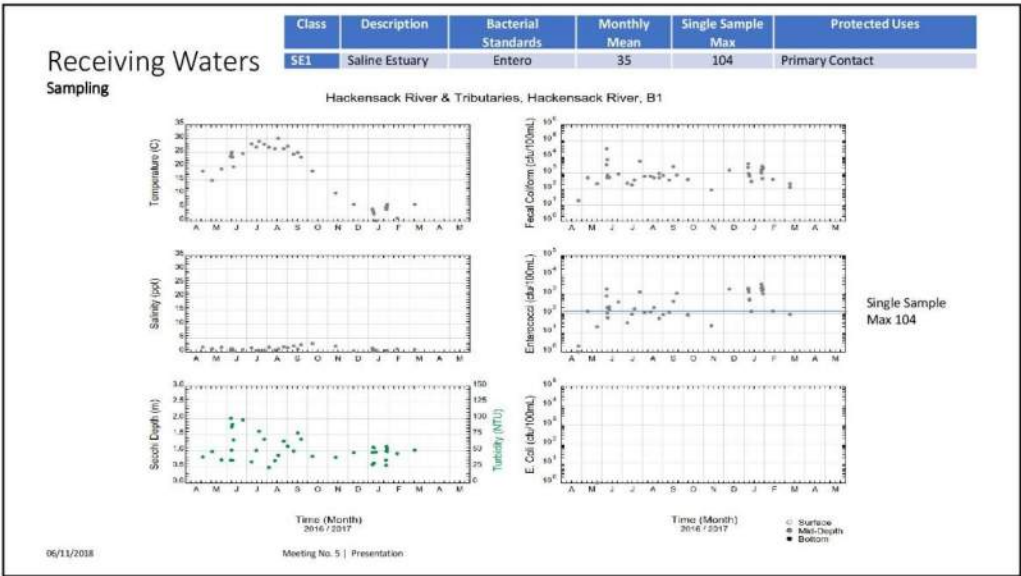
Sampling



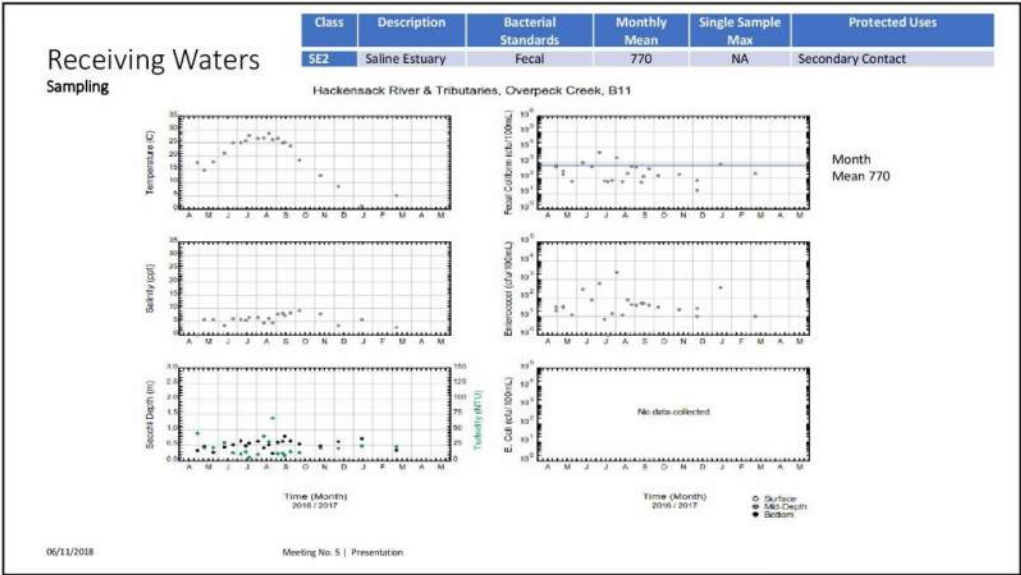
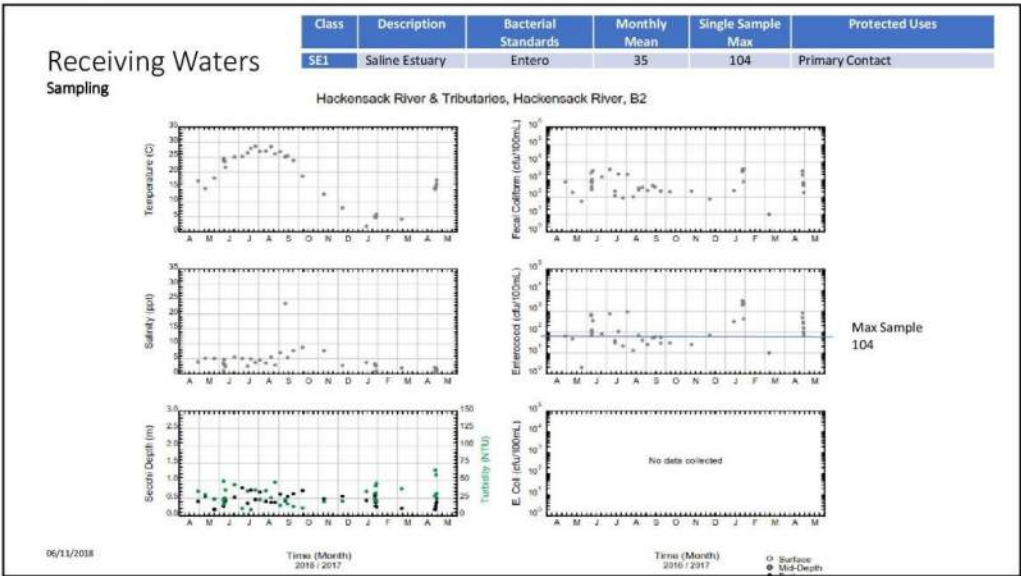
06/11/2018

Meeting No. 5 | Presentation

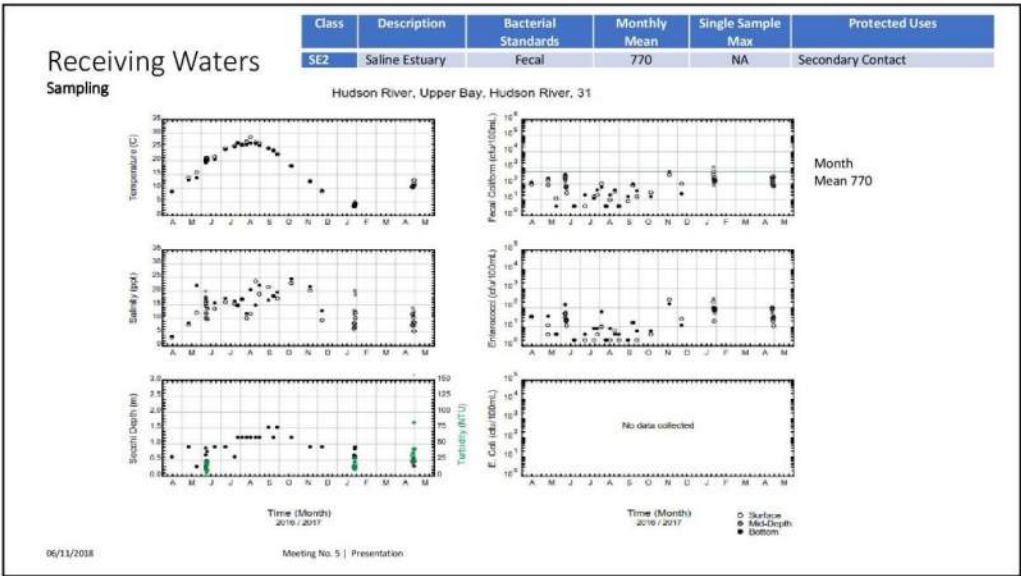
6/25/2018



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Supplemental CSO Team

Meeting No. 5

BCUA Sewer System Characterization Study

Modelling Results for:

- BCUA Trunk Sewer System
- Borough of Fort Lee
- City of Hackensack
- Village of Ridgefield Park

06/12/2018

Meeting No. 5 | Presentation

6/25/2018

Sewer System Characterization Report

Description

The Major Elements of a Sewer System Characterization Include:

- I. Rainfall Records (Typical Year Analysis)
- II. Combined Sewer Characterization (Most using 2007 data with updates)
Studies to understand the physical sewer system, including the number, location, and frequency of overflows.
- III. CSO Monitoring (Most using 2007 data with updates)
Studies to measure the frequency, duration, flow rate, volume and pollutant concentrations of CSO discharges.
- IV. Modeling (Most using 2007 models with updates)
Calibration and Verification of EPA approved Models to aid in characterization
- V. Sensitive Area Analysis

06/12/2018

Meeting No. 5 | Presentation

Sewer System Characterization Report

Description

The Major Elements of a Sewer System Characterization Include:

- I. Rainfall Records (Typical Year – Meeting 2)
- II. Combined Sewer Characterization (Meeting 1 and 2)
- III. CSO Monitoring (Meeting 2)
- IV. Modelling (Today's Topic)
- V. Sensitive Area Analysis (Meeting 4)

06/12/2018

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6/25/2018

BCUA Sewer System Characterization / Modeling
Description

- The BCUA consists of the following:
 - 47 member municipalities
 - 1 primary wastewater treatment plant (Little Ferry)
 - 108 miles of conveyance interceptor sewers
- Member communities:
 - 3 municipalities with combined sewers (and combined sewer overflows)
 - 44 municipalities with separate sanitary and storm sewers

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Meeting No. 5 | Presentation

BCUA model development goals

1

Accurately represent the performance of the BCUA infrastructure

2

Realistically represent the flows from the BCUA member municipalities

3

Consistently meet model calibration/validation criteria

4

Ultimately have a reliable tool for the evaluation of alternatives.

25 June 2018

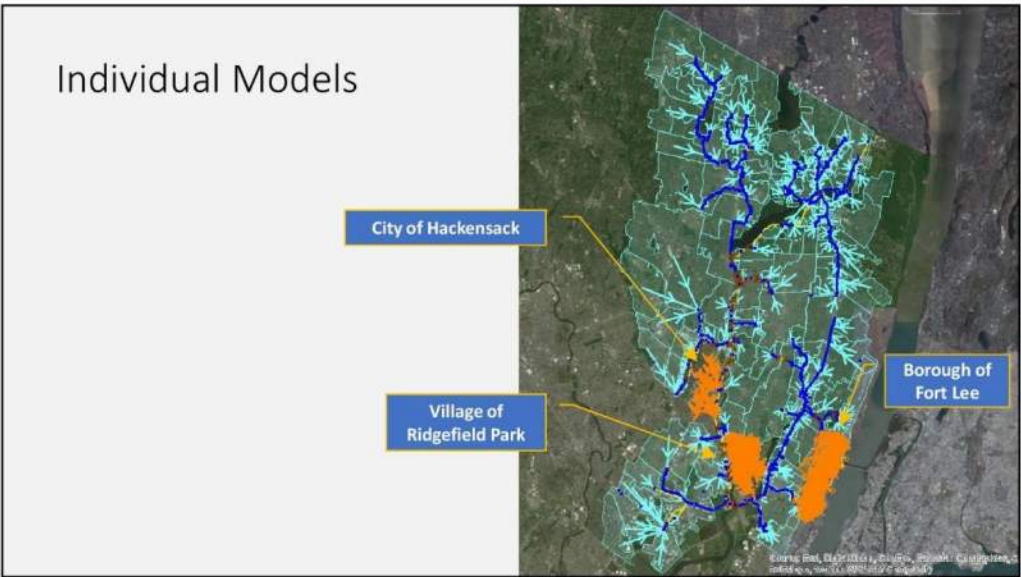
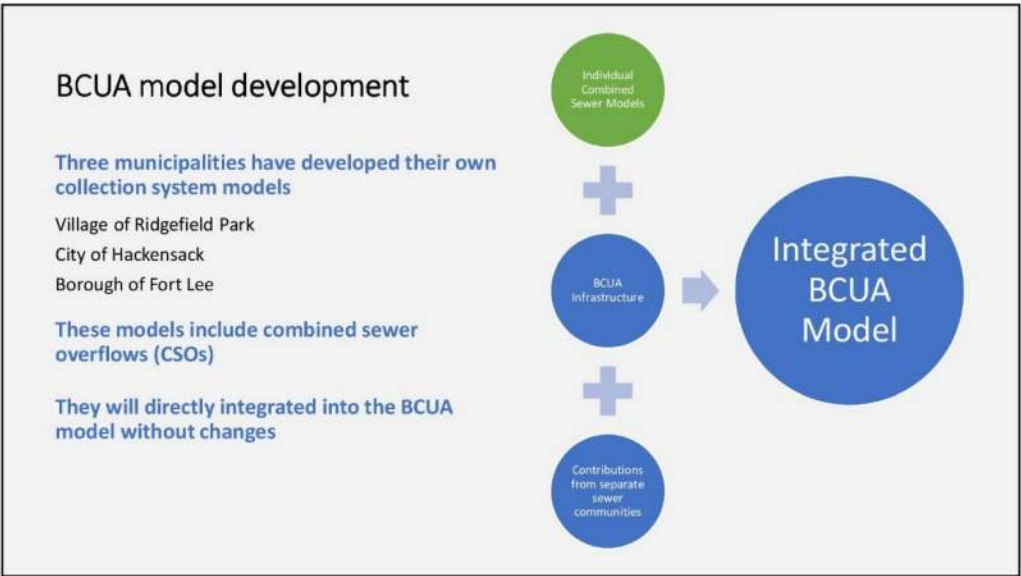
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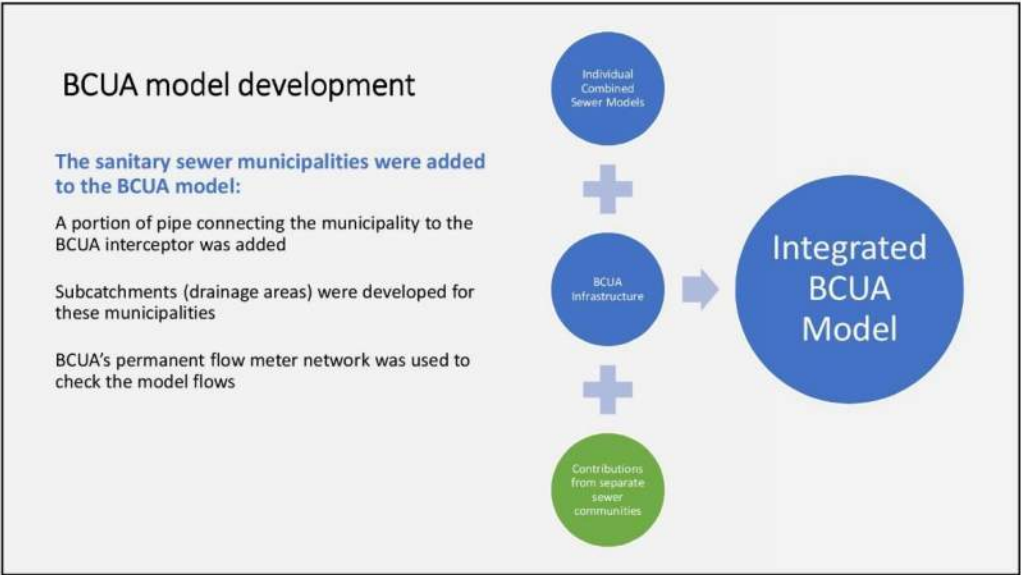
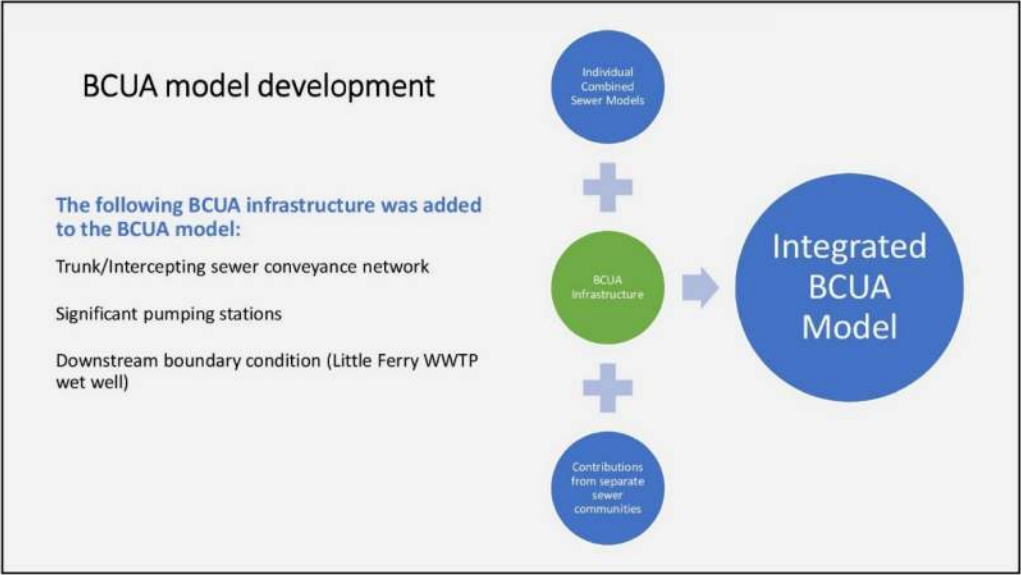
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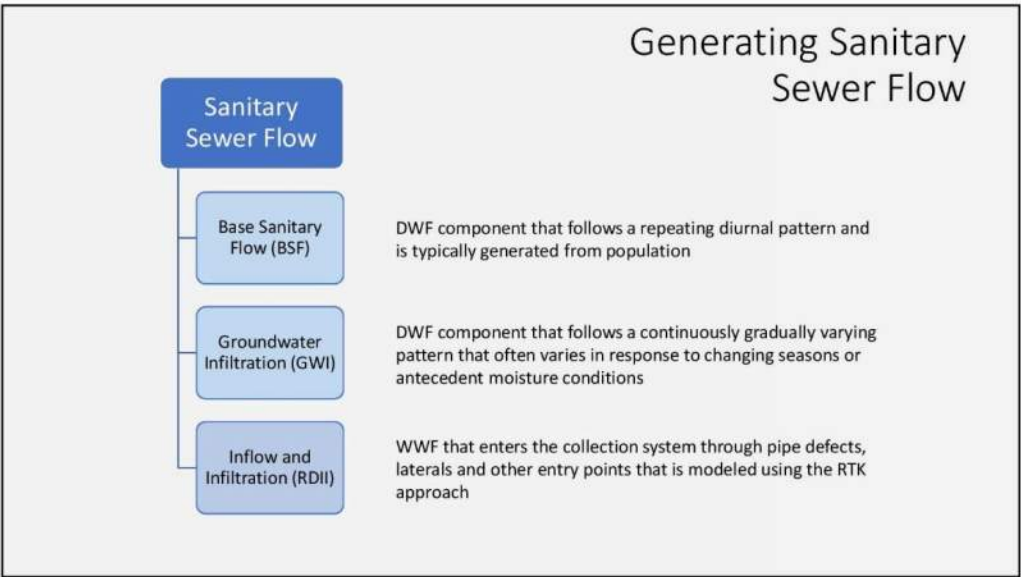
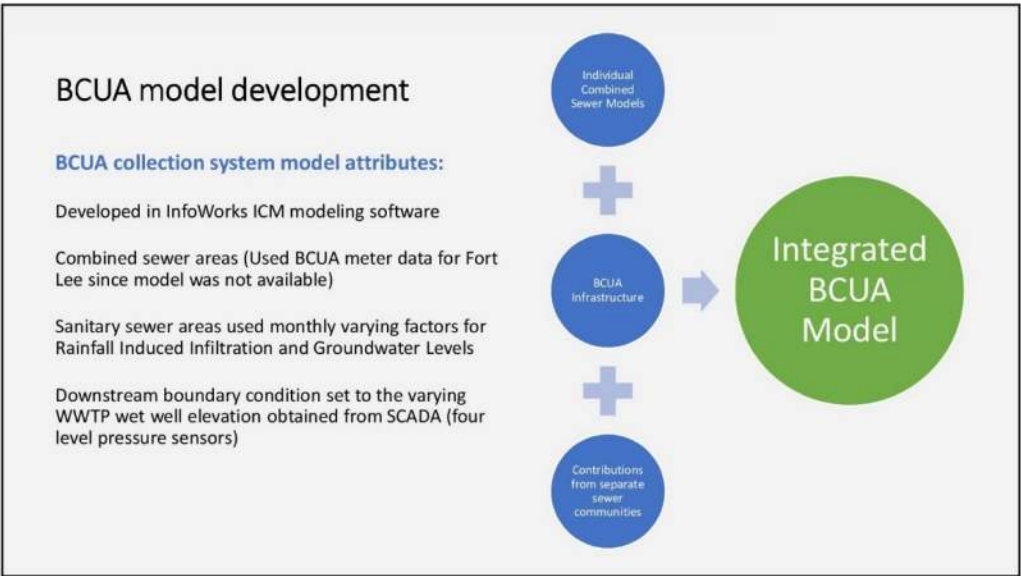
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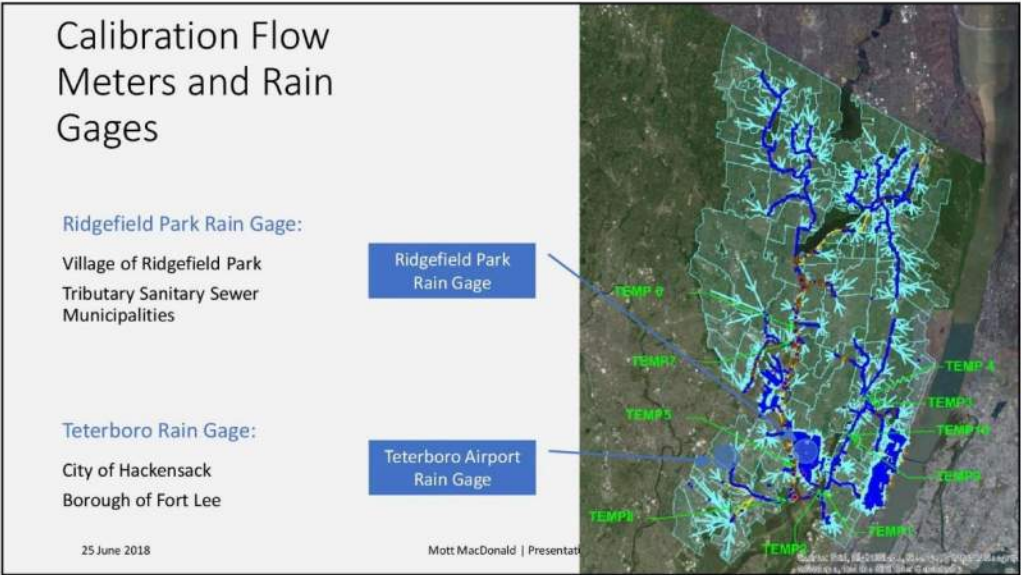
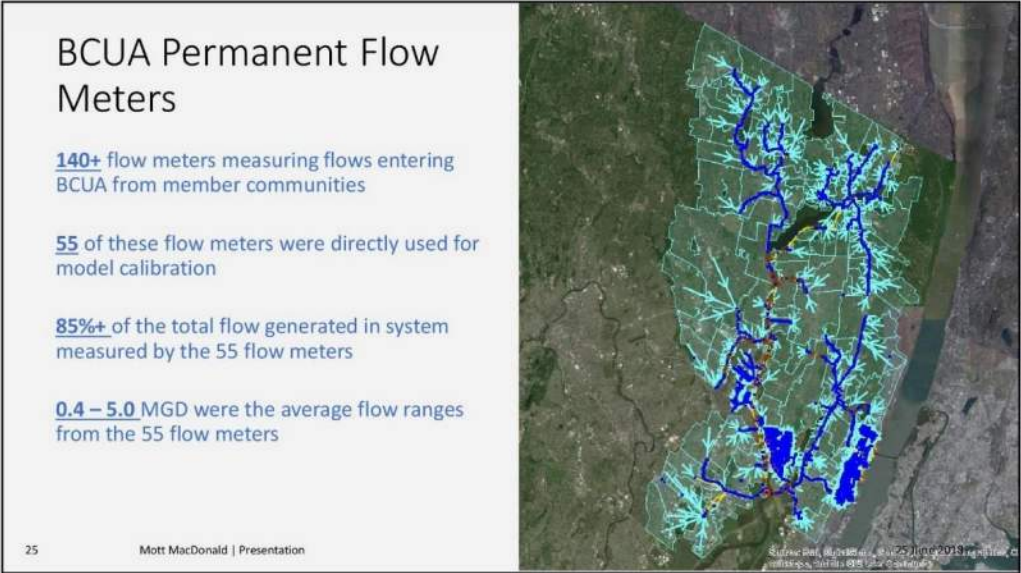
6/25/2018



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6/25/2018



6/25/2018

Selecting Calibration/Validation Storm Events

Good Storm Selection Includes a Variety of:

- Storm durations
- Rainfall intensities
- Rainfall volumes
- Seasons
- Antecedent conditions



Calibration/Validation Storm Events

This very large storm event was not used for calibration or validation but was referenced for overall system performance.

Classification	Start Date/Time	Rainfall (in)	Duration (hr)	Peak Intensity (in/hr)
Calibration	03/31/17 0:30	1.50	29.25	0.19
Calibration	04/20/17 5:45	0.12	1.75	0.10
Calibration	04/21/17 0:15	0.39	7.33	0.23
Reference	05/05/17 3:50	2.87	22.50	1.18
Validation	05/13/17 2:30	1.67	37.75	0.19
Calibration	05/25/17 4:25	0.73	25.42	0.11
Calibration	05/31/17 20:55	0.24	0.75	0.24
Validation	06/16/17 17:10	0.10	0.58	0.10
Validation	06/17/17 11:15	0.35	2.25	0.26
Calibration	06/23/17 21:35	1.16	10.08	0.59
Calibration	07/07/17 8:00	0.89	24.17	0.60
Calibration	07/22/17 23:00	0.41	6.08	0.25
Calibration	07/24/17 0:05	0.81	12.17	0.28
Validation	08/07/17 10:15	0.89	10.50	0.31
Calibration	08/15/17 2:45	0.12	1.17	0.11
Validation	08/18/17 7:45	1.42	12.58	1.31

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Calibration/Validation Storm Event Return Period Analysis

BCUA Model Calibration/Validation Rainfall Return Period Analysis					
Date		Volume (inches)	Return Period Months	Peak hourly (in/hr)	Return Period Months
3/31/2017	Calibration	1.5	2.3	0.19	0.3
4/20/2017	Calibration	0.12	0.2	0.1	0.1
4/21/2017	Calibration	0.39	0.3	0.23	0.4
5/25/2017	Calibration	0.73	0.6	0.11	0.1
5/31/2017	Calibration	0.24	0.2	0.24	0.4
6/23/2017	Calibration	1.16	1.3	0.59	2.6
7/7/2017	Calibration	0.89	0.8	0.6	2.8
7/22/2017	Calibration	0.41	0.3	0.25	0.4
7/24/2017	Calibration	0.81	0.7	0.28	0.5
8/15/2017	Calibration	0.12	0.2	0.11	0.1
Range			0.2 - 2.3		0.1 - 2.8
5/5/2017	Reference	2.87	15.9	1.18	21.4
5/13/2017	Validation	1.67	3.1	0.19	0.3
6/16/2017	Validation	0.1	NA	0.1	0.1
6/17/2017	Validation	0.35	0.3	0.26	0.4
8/7/2017	Validation	0.89	0.8	0.31	0.6
8/18/2017	Validation	1.42	2.1	1.31	28.1
Range			0.3 - 3.1		0.1 - 28.1

This very large storm event was not used for calibration or validation but was referenced for overall system performance.

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Model Calibration/Verification Review

- The state of model calibration/validation was evaluated by reviewing:
 - Peak Flow vs. Peak Flow graphs
 - Volume vs. Volume graphs
 - Individual storm results vs. calibration/validation criteria
- Overall goals when reviewing calibration:
 - High R^2 value and low bias in the peak flow and volumes graphs
 - Sufficient number of storm events meeting calibration/validation numerical criteria

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Calibration/Validation Notes

The final Fort Lee model is not yet available, so inflow time series from the permanent meters were used instead (for now).

It was challenging to match pairs of temp meters that were on opposite sides of a flow split (even when the total flow checked out).

At times (but rarely) there was evidence of the rainfall being non-representative of the true rainfall that fell over the system.

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Temporary Flow Meters were used in addition to BCUA permanent meters:

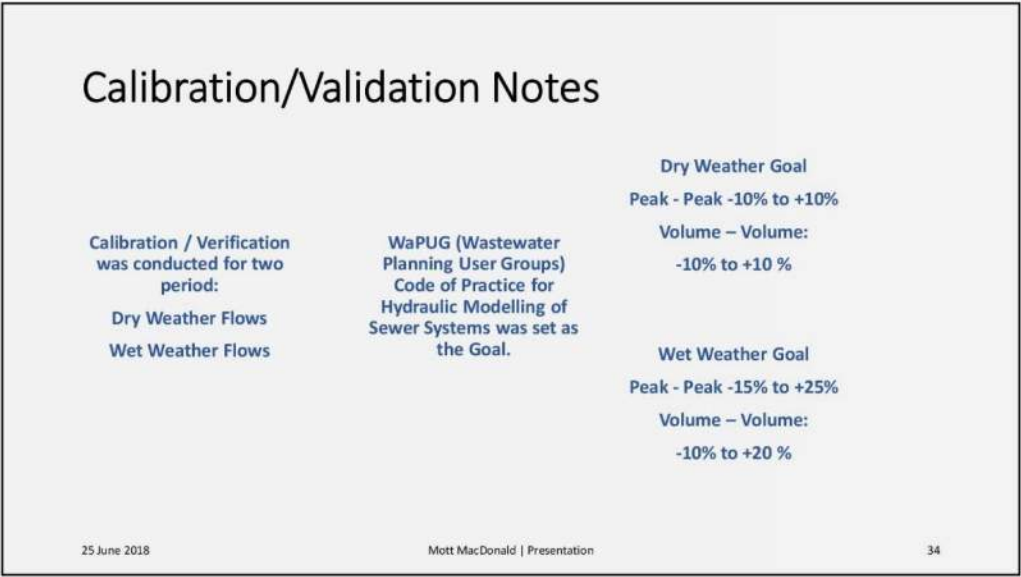
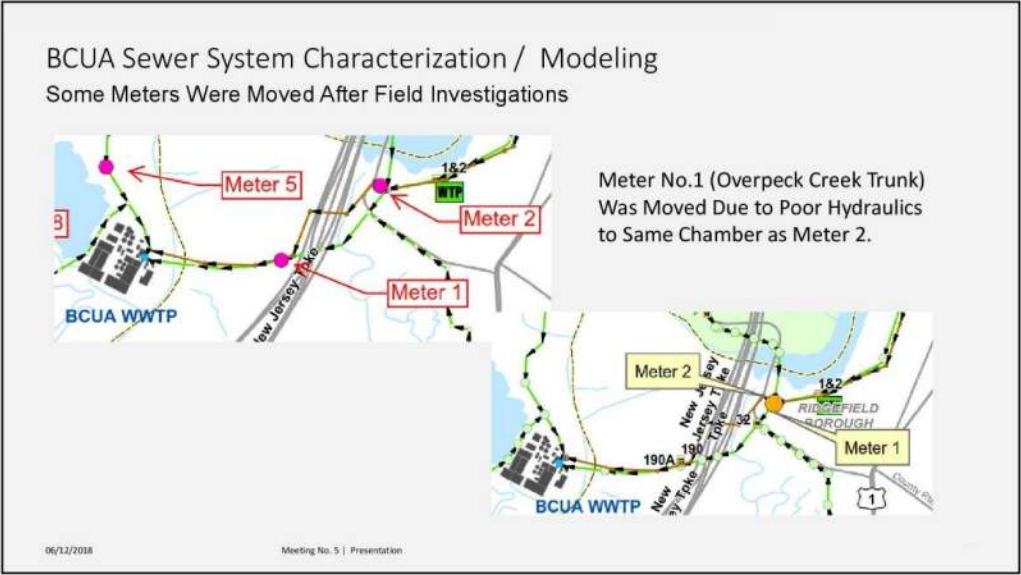
- Meters 1, 3, & 10 – Overpeck Trunk Sewer
- Meters 2, 4, & 9 – Overpeck Relief Sewer
- Meters 5 and 6 – Main Trunk Sewer
- Meters 7 and 8 – Branch Trunk Sewers



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Calibration/Verification of Hydraulic Model

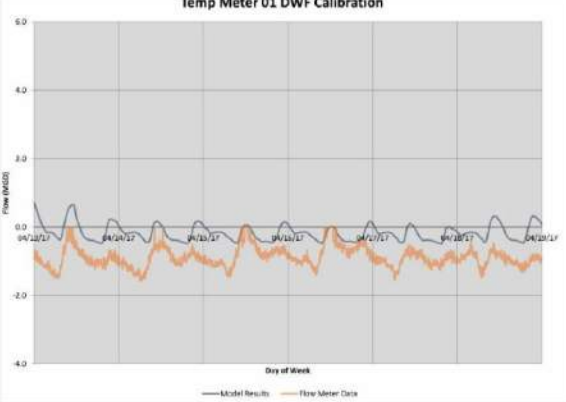
Dry Weather Flows

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BCUA Sewer System Characterization / Modeling

Calibration Results – Meter 1

Temp Meter 01 DWF Calibration

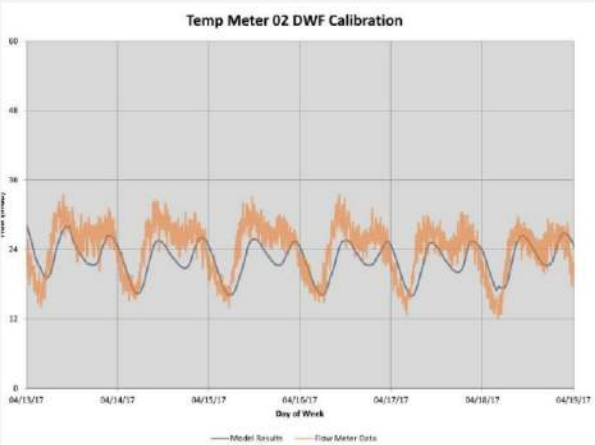


Unfortunately the Meter showed flows flowing towards to Chamber instead of the WPCF thus Negative Flows.

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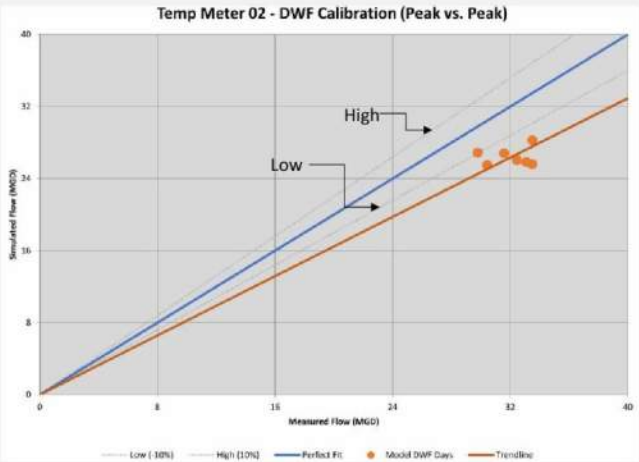
BCUA Sewer System Characterization / Modeling



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BCUA Sewer System Characterization / Modeling



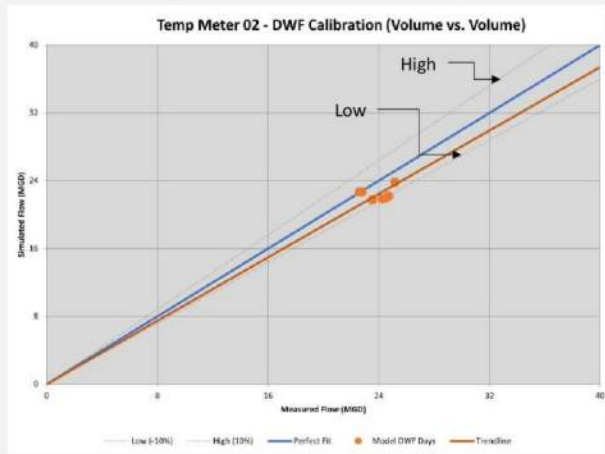
06/12/2018

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Ideally Points Fall within Low (-10%) and High (+10%) Bands.

6/25/2018

BCUA Sewer System Characterization / Modeling

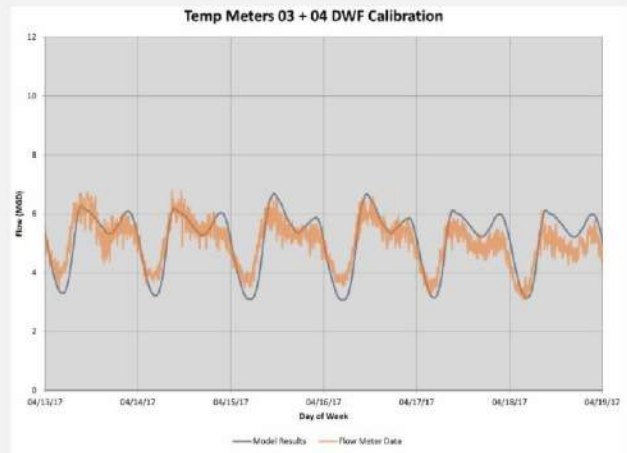


06/12/2018

Meeting No. 5 | Presentation

Flow Volume Was More in Line with Anticipated Results – Difficult to Model Due to Split Flows Between the Overpeck Trunk Sewer and Overpeck Relief Sewer

BCUA Sewer System Characterization / Modeling

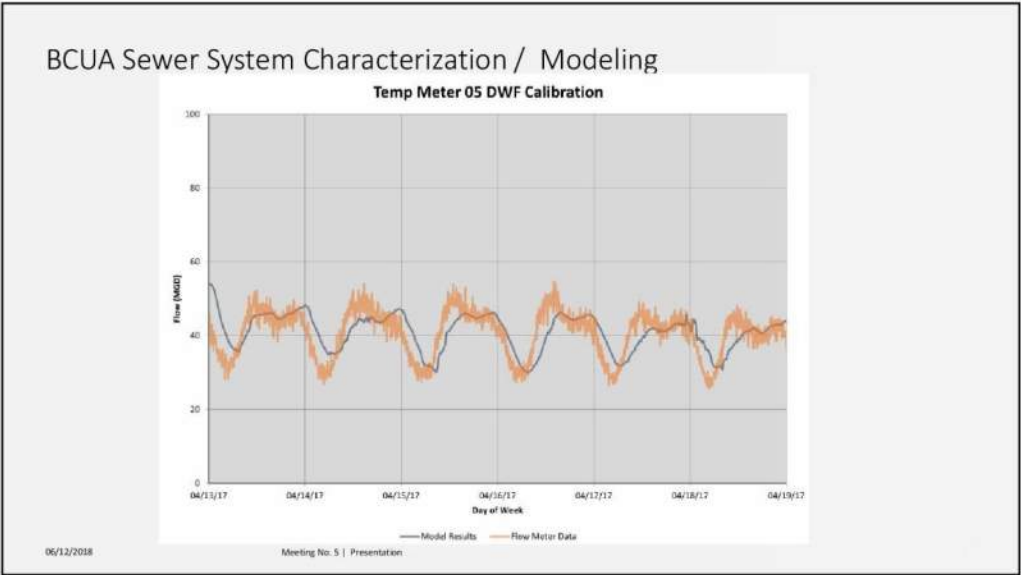
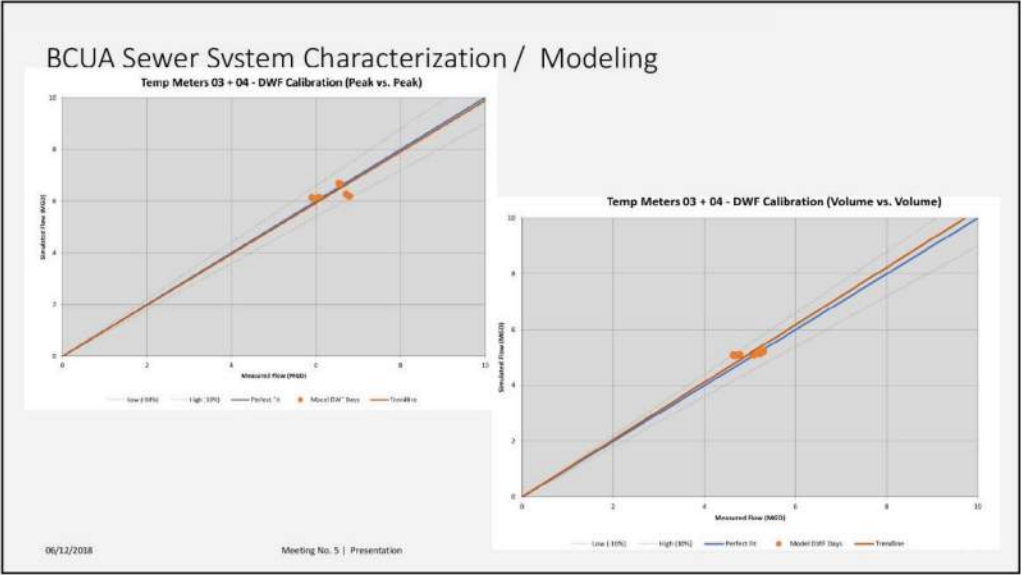


06/12/2018

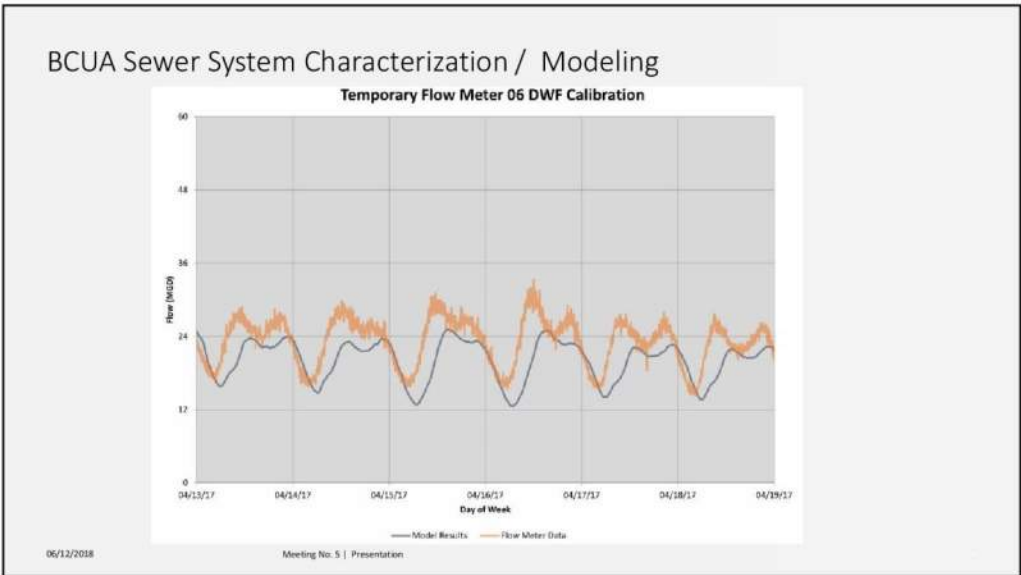
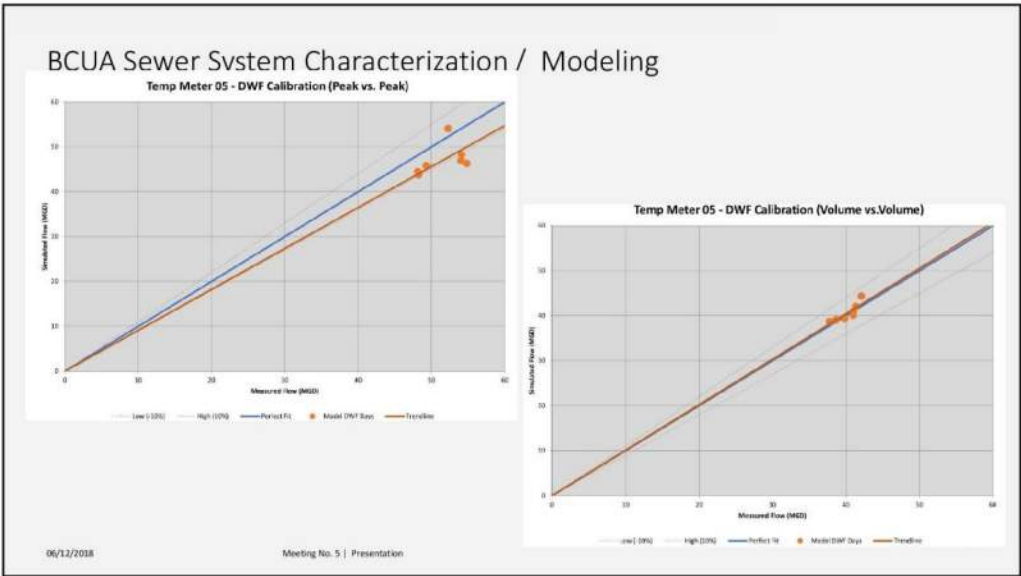
Meeting No. 5 | Presentation

While looking at Individual Meters on the Trunk Sewer and Relief Sewer were not perfect. Looking at Total Flow between the Trunk and Relief Sewer gave much better results.

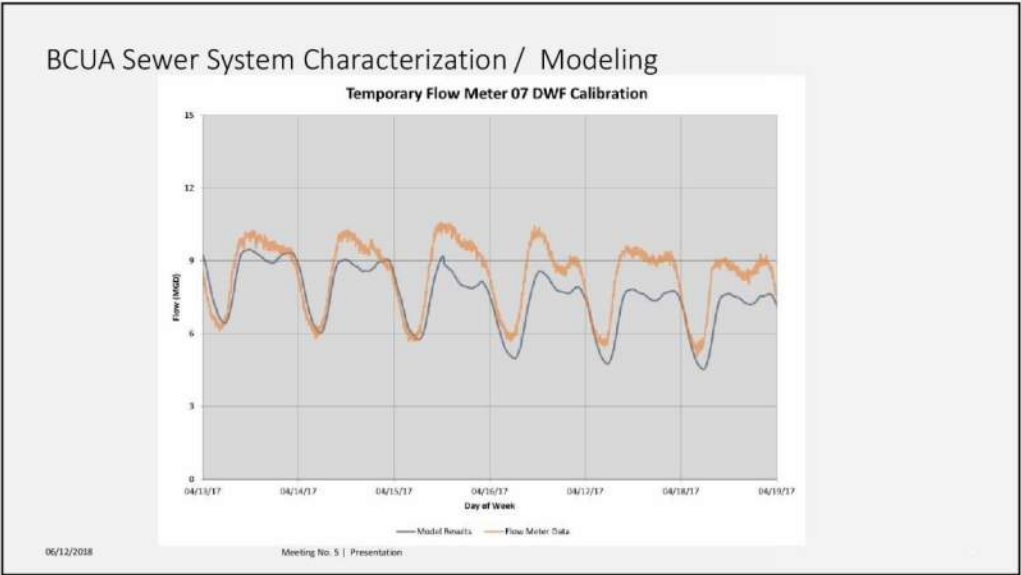
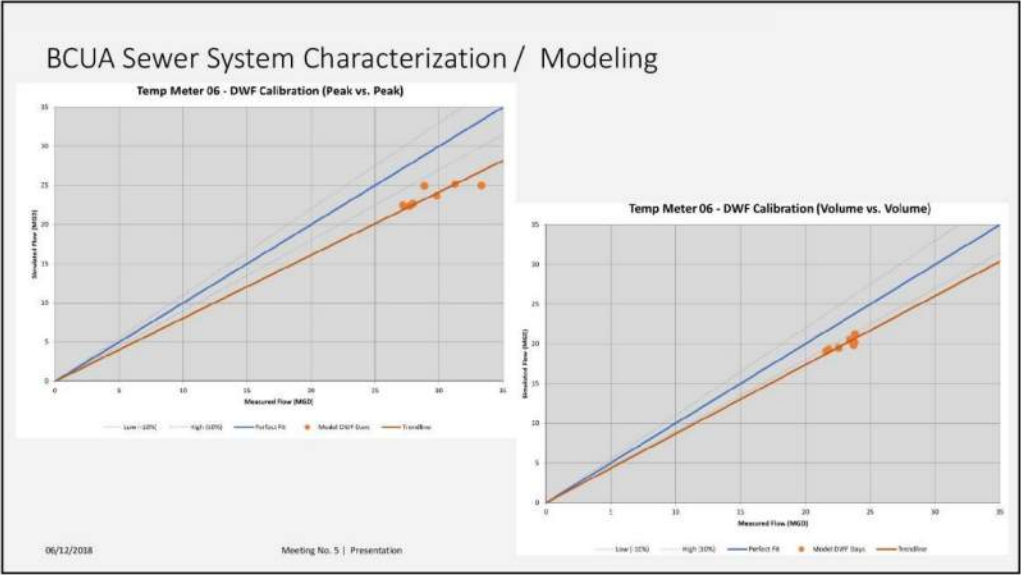
6/25/2018



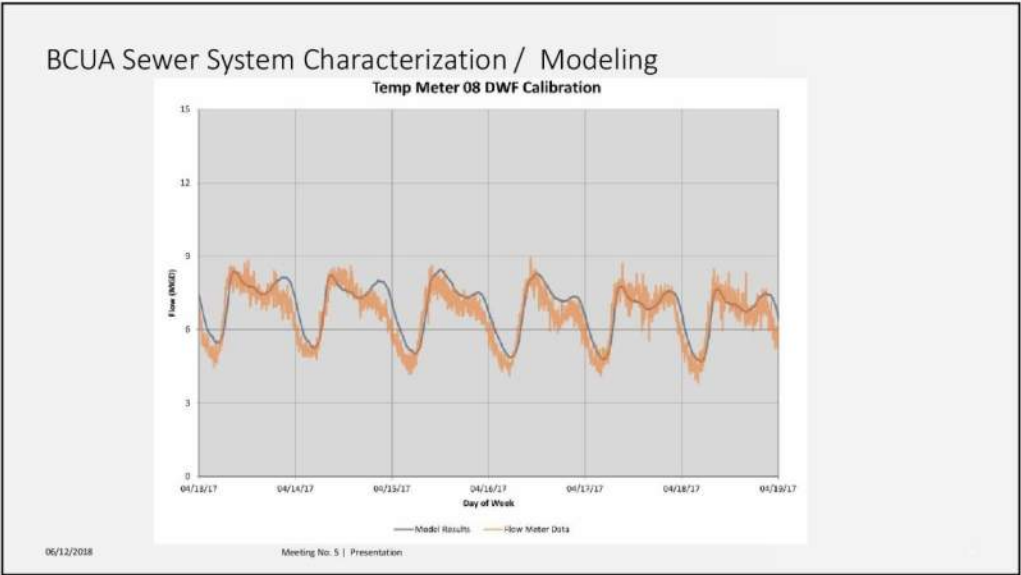
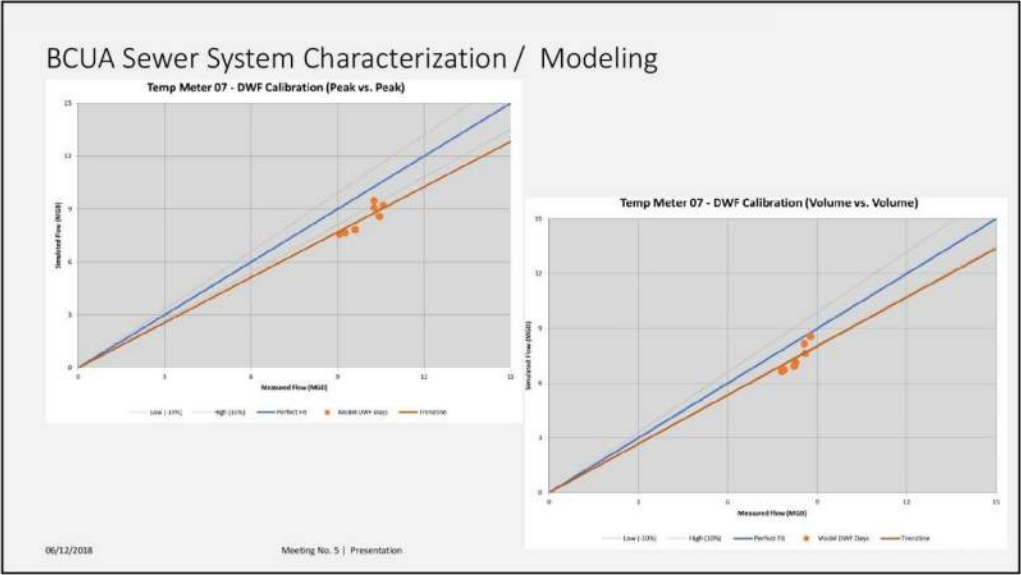
6/25/2018



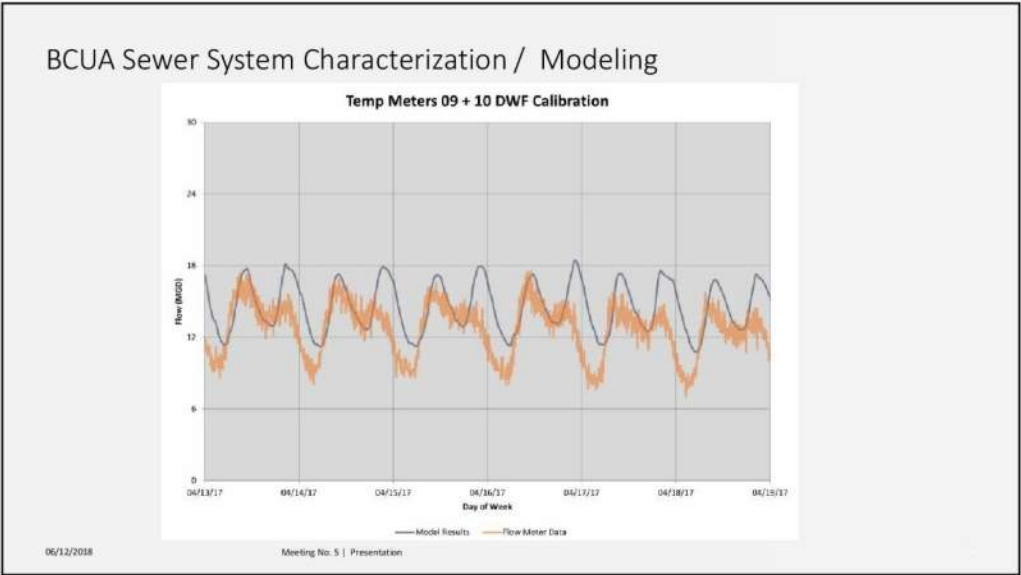
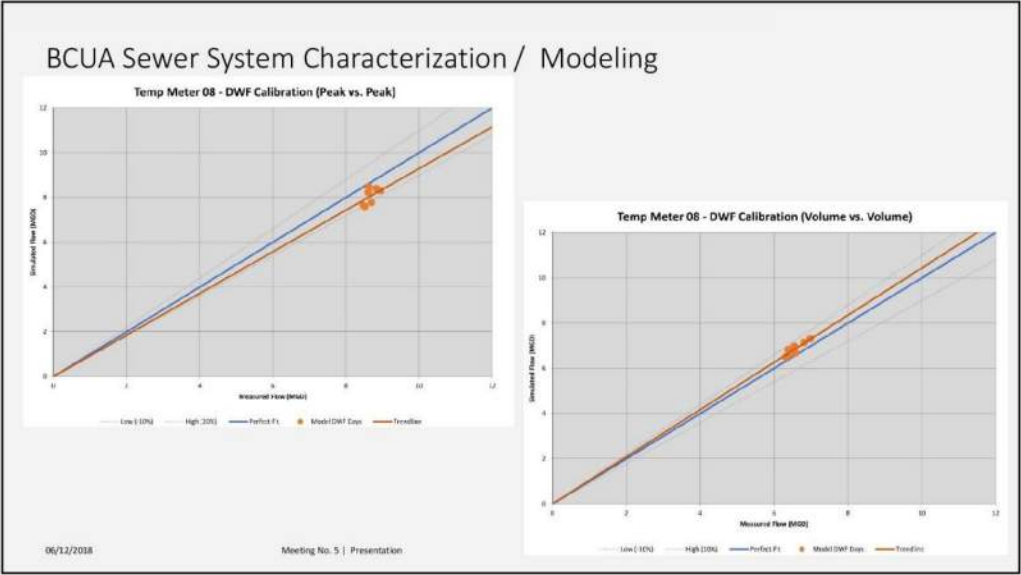
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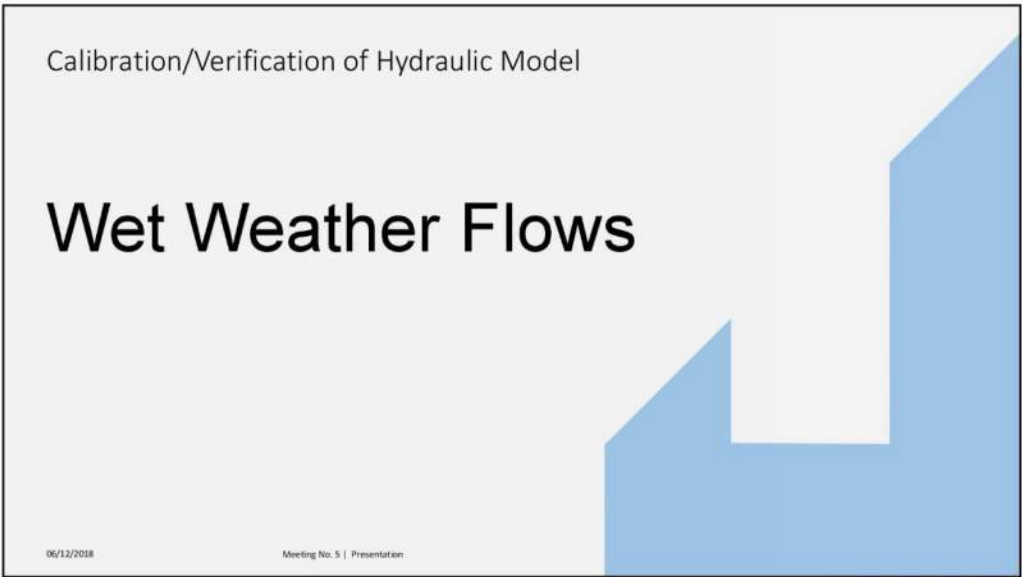
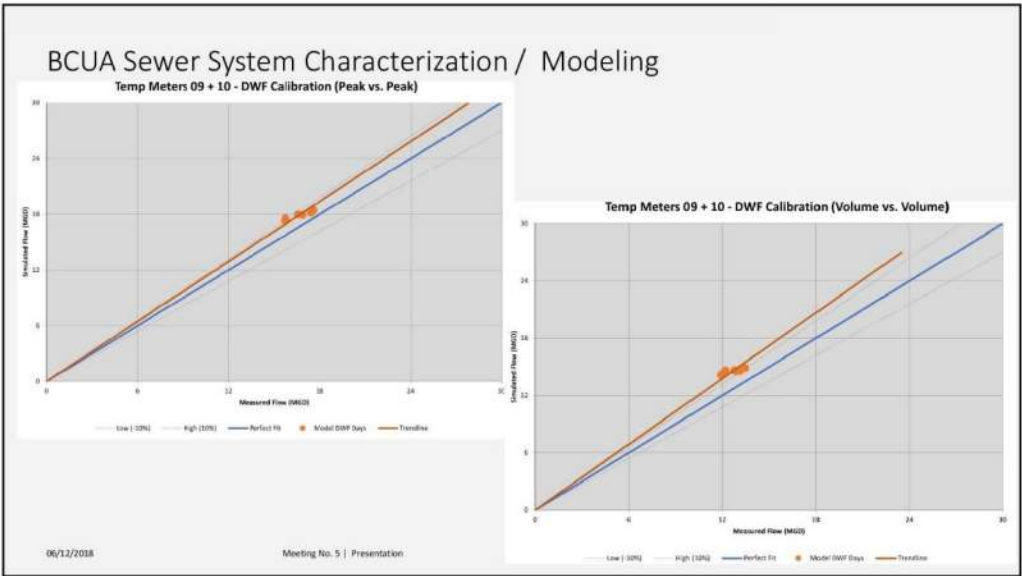
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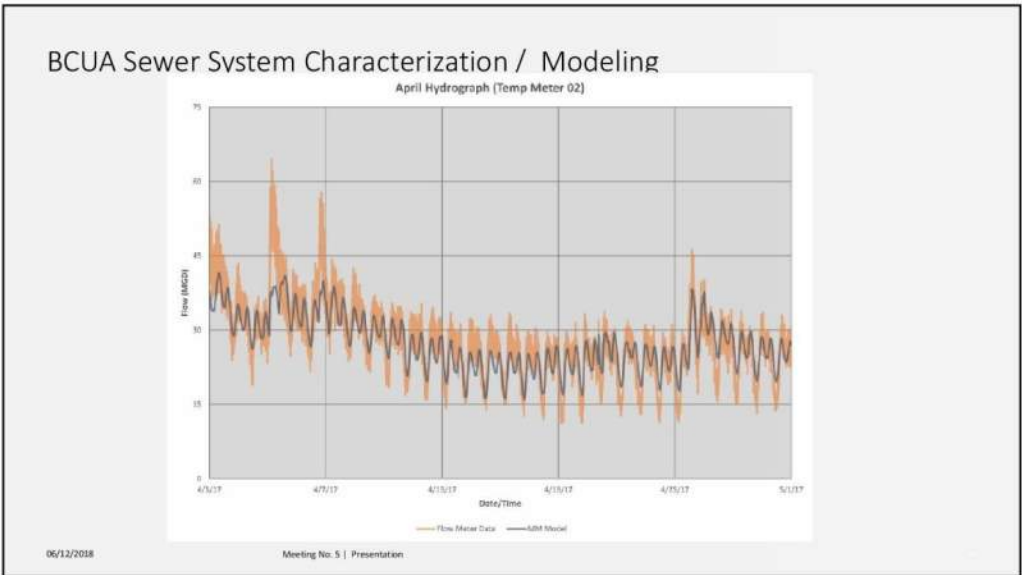
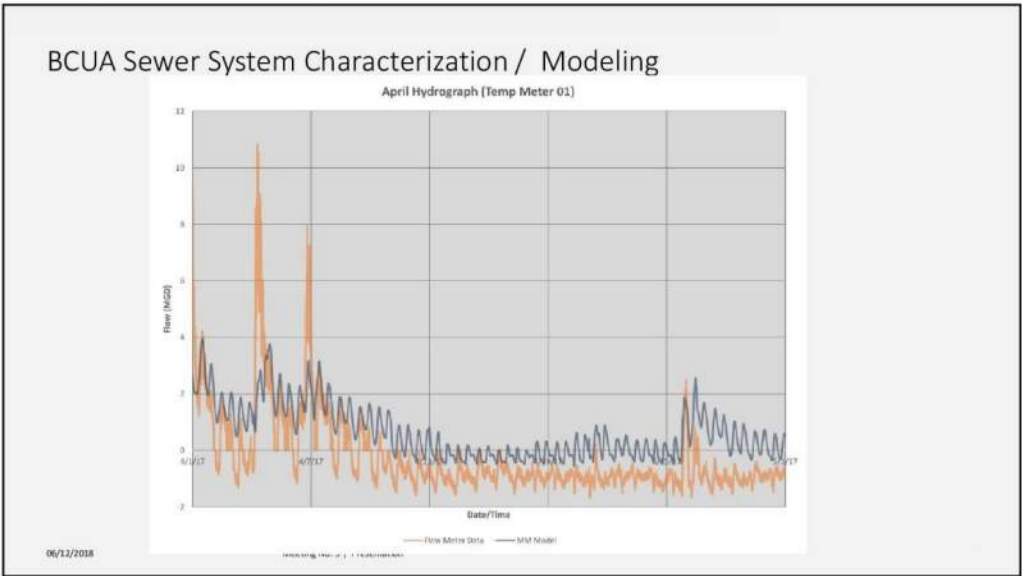
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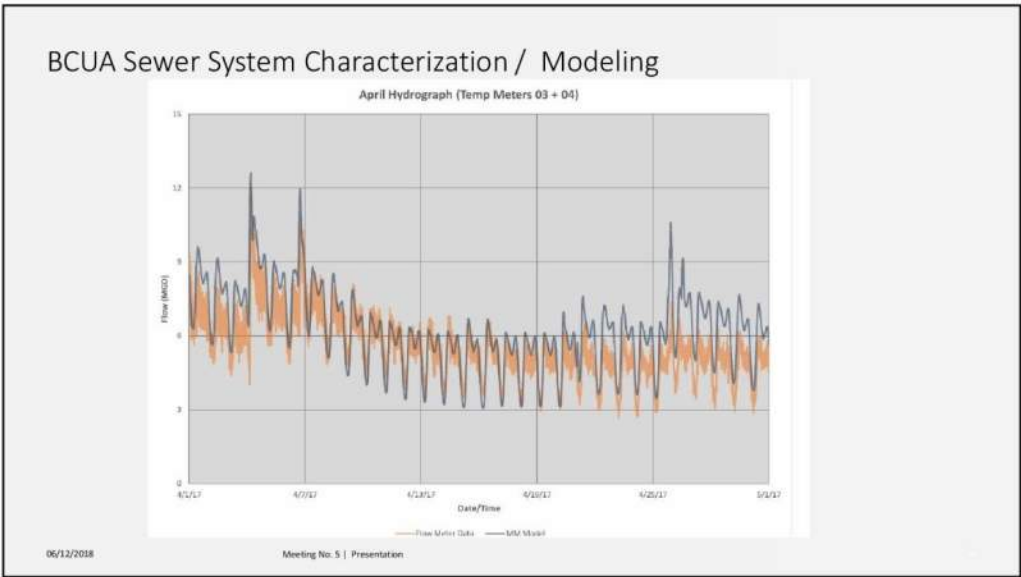
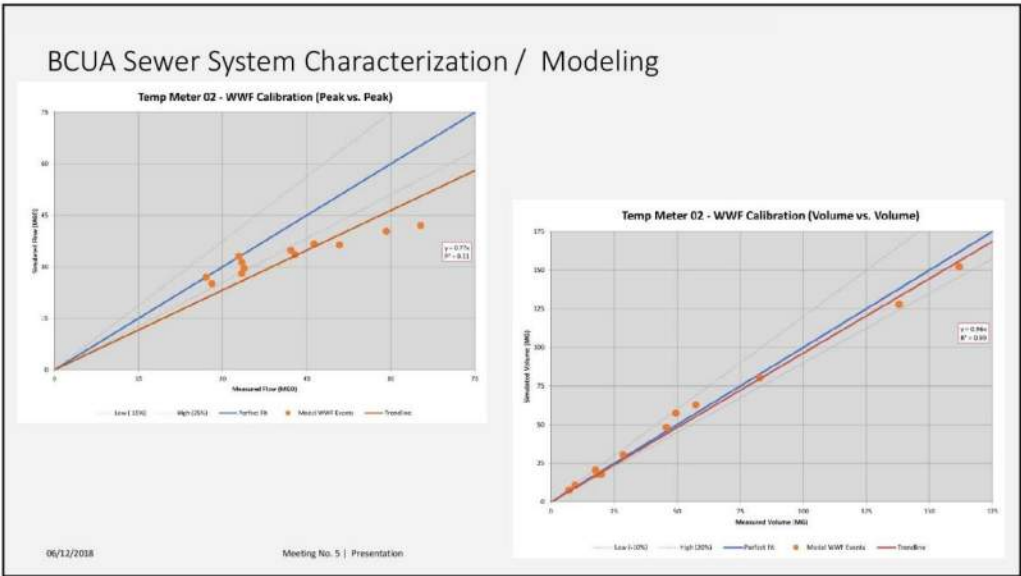
6/25/2018



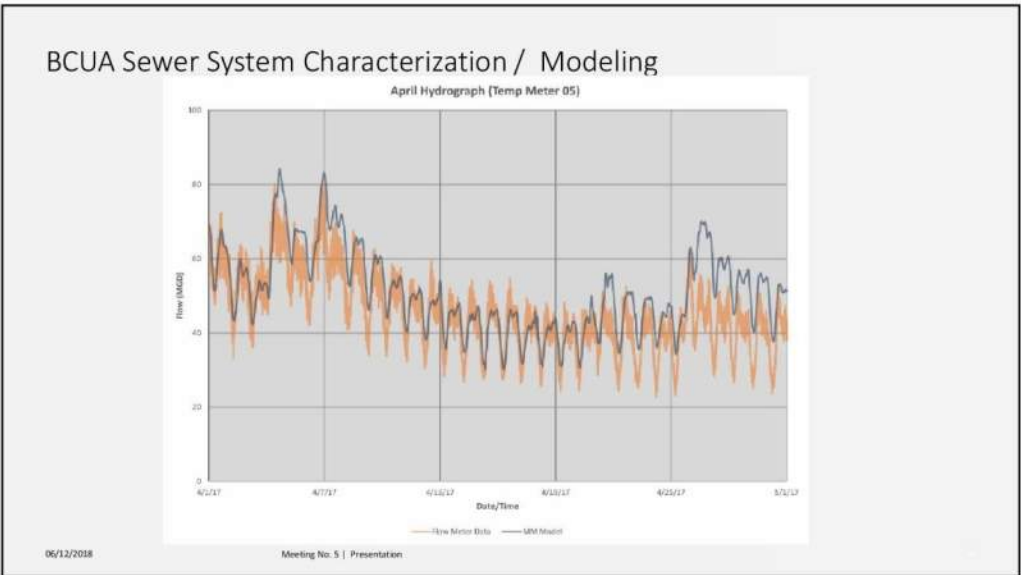
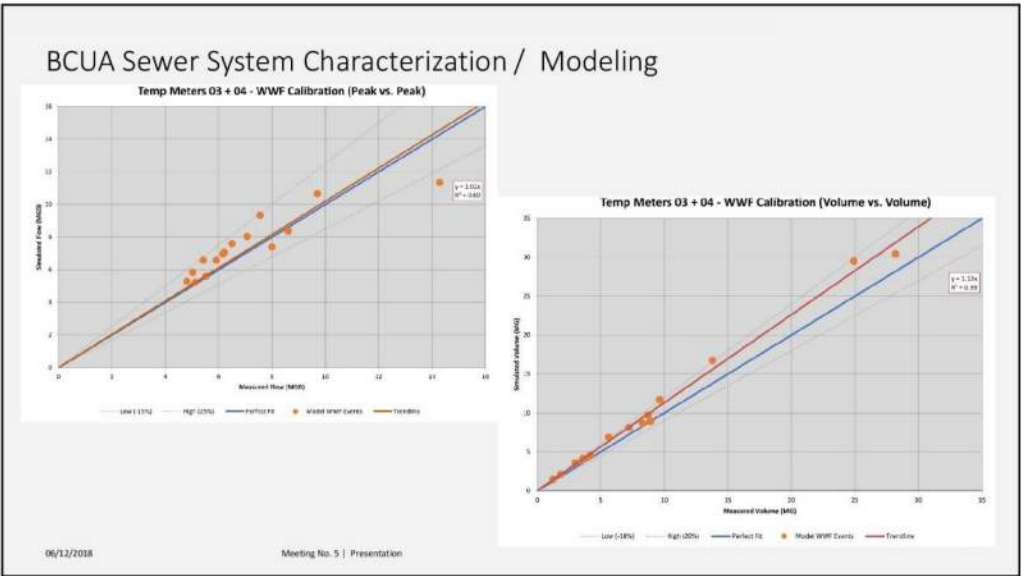
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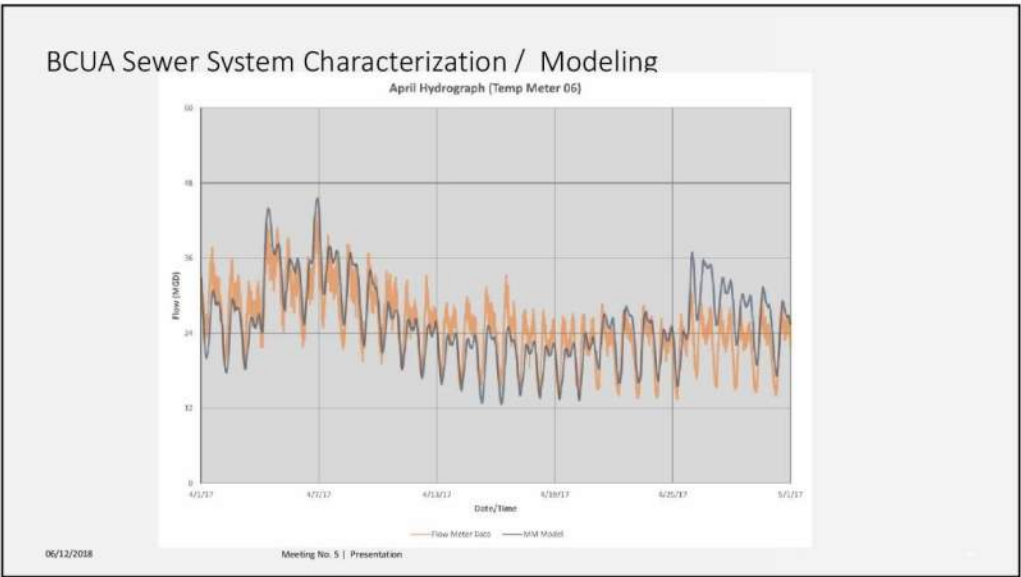
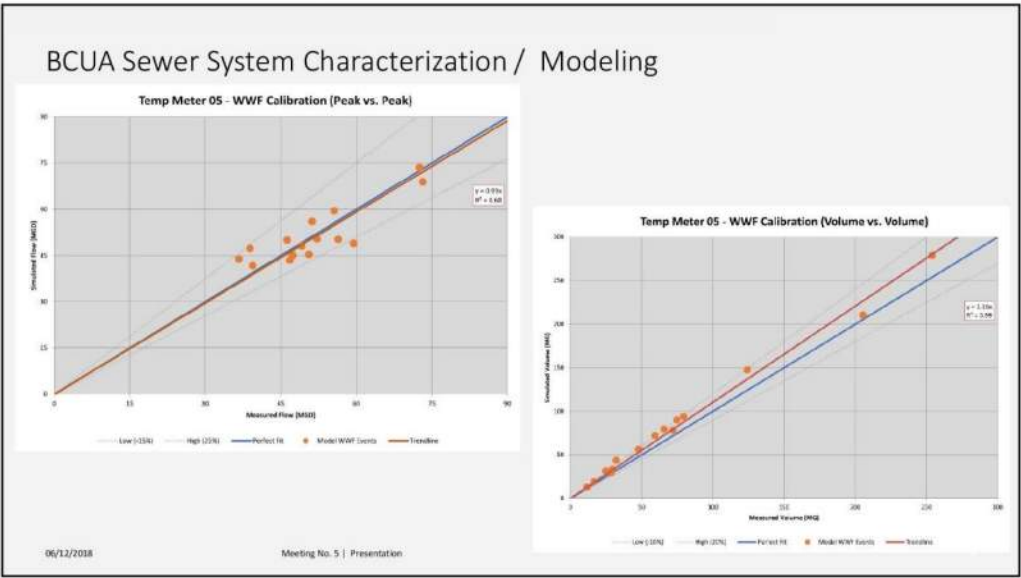
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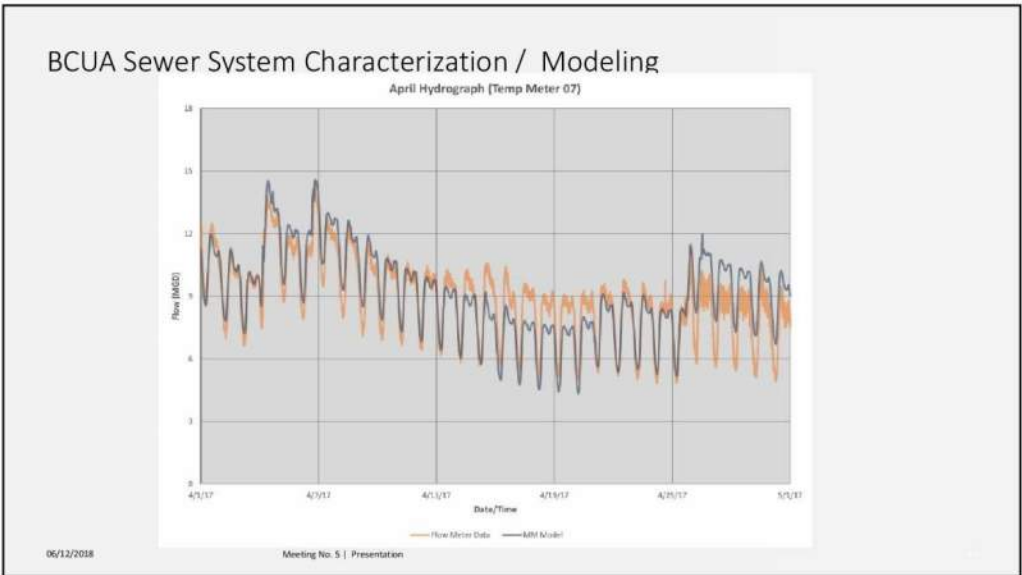
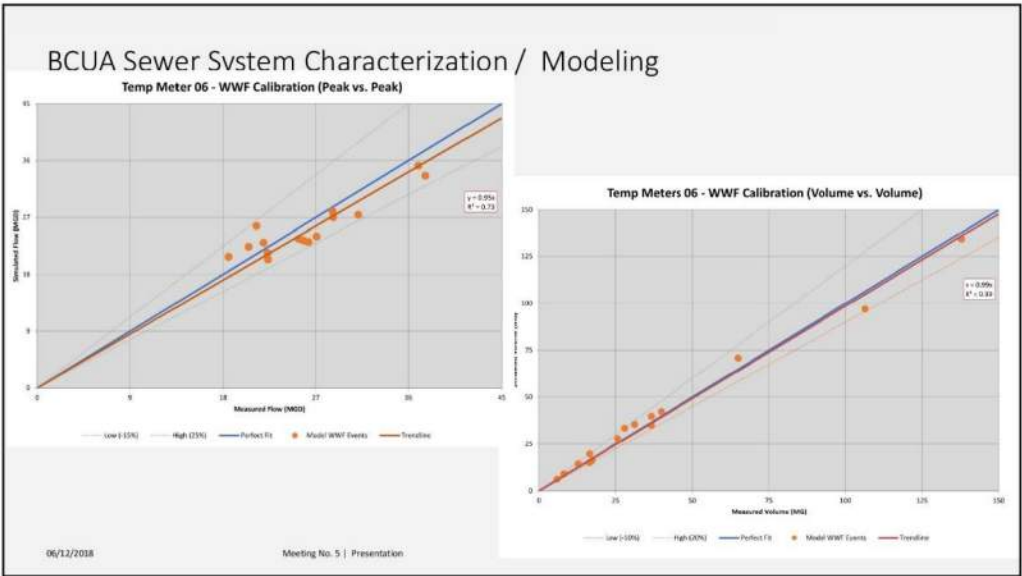
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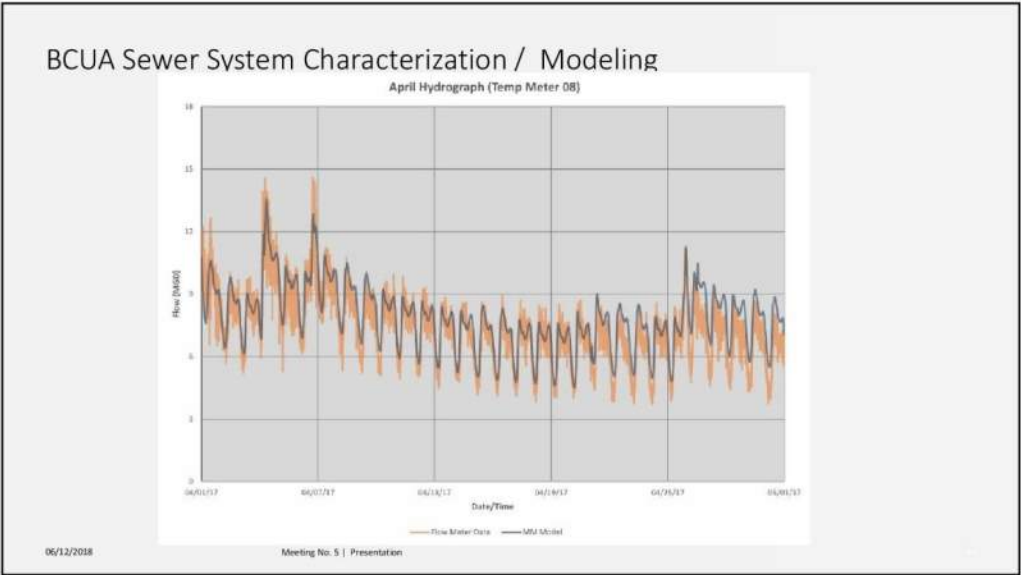
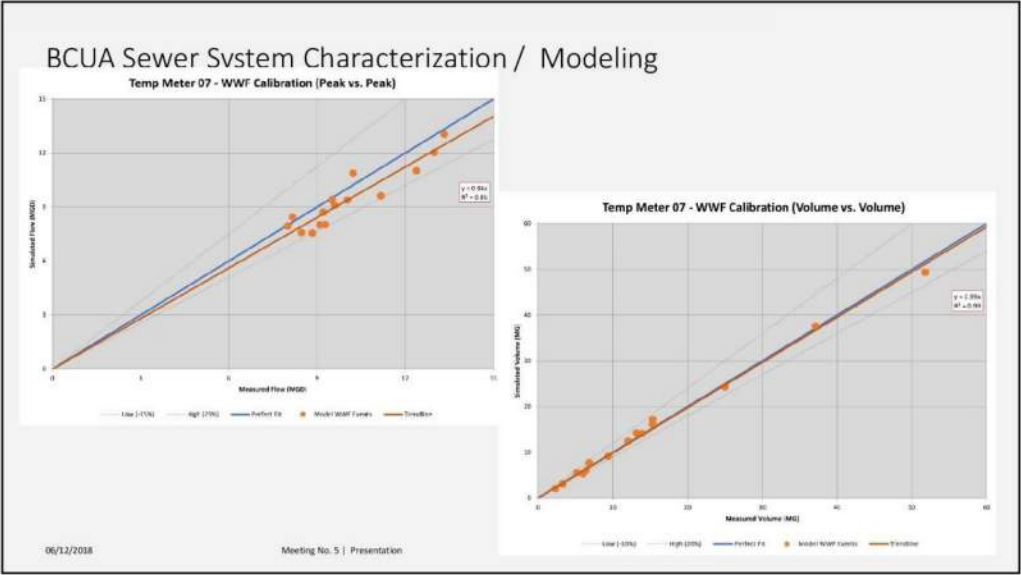
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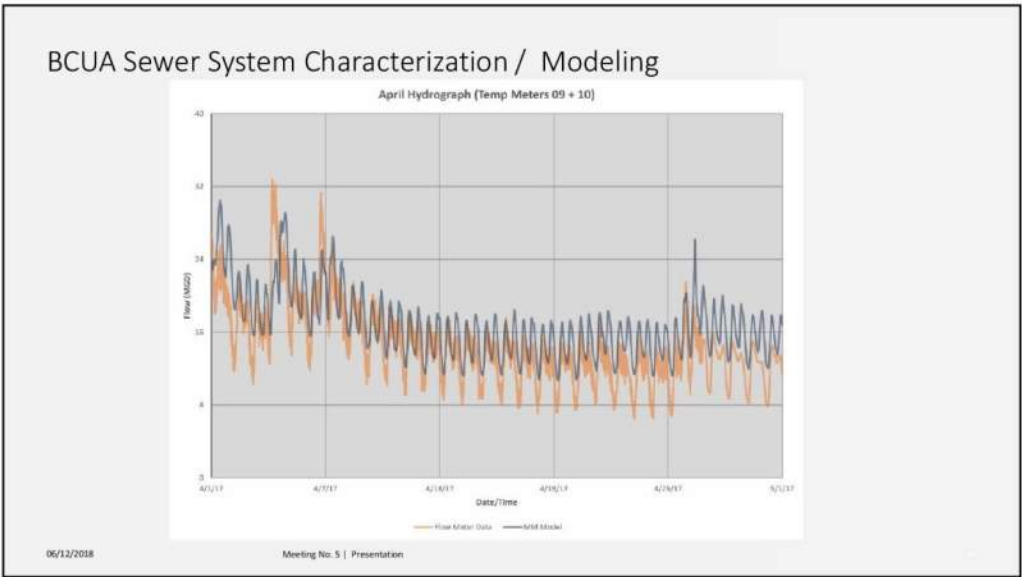
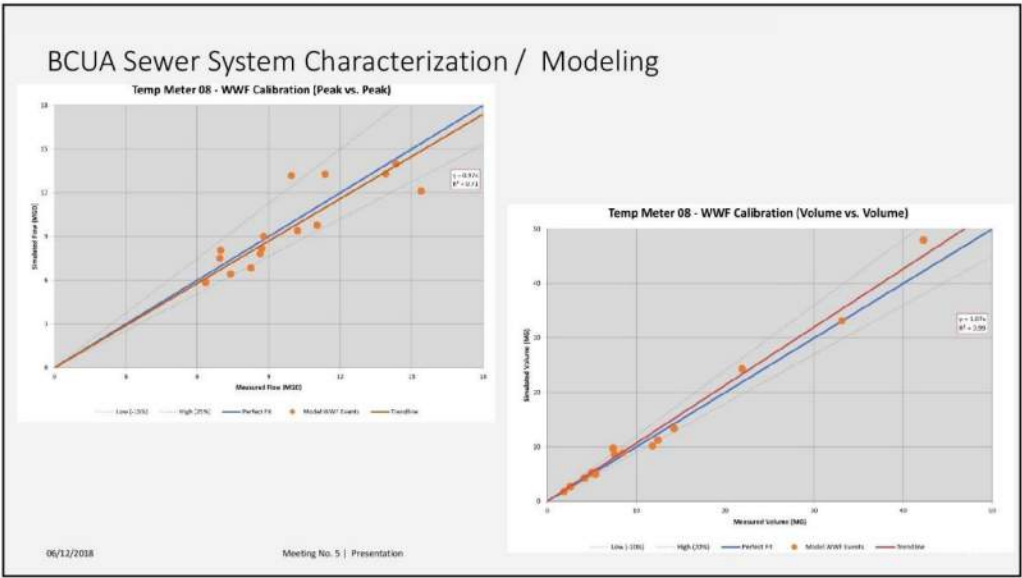
6/25/2018



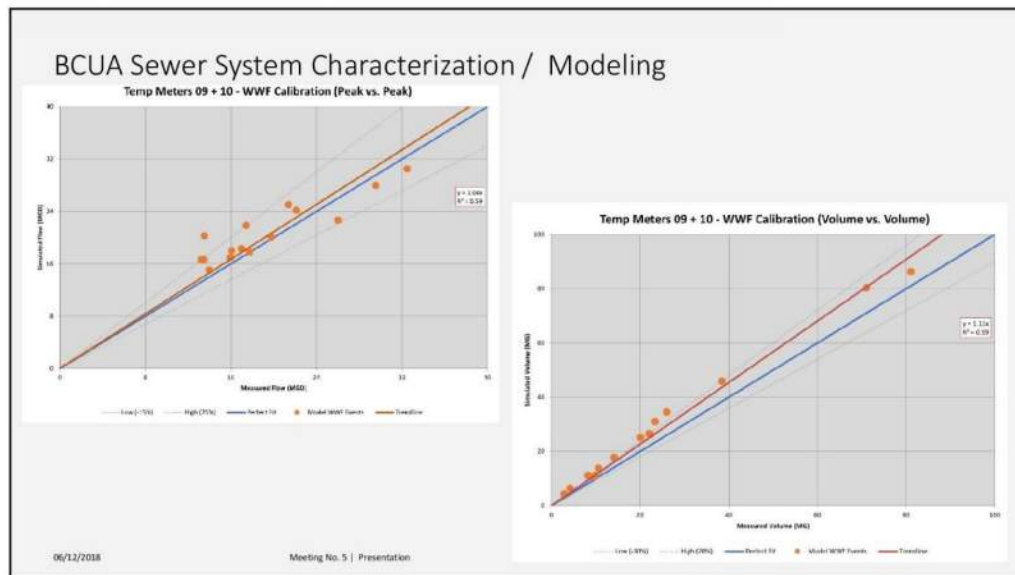
6/25/2018



6/25/2018



6/25/2018



BCUA Sewer System Characterization / Modeling

Facts:

- a. Flow in Sewer Systems are dynamic. (not steady)
- b. Hydraulic models are not perfect.
- c. Hydraulic models are meant to predict typical background conditions and responses to rainfall.
- d. The BCUA model does not mimic individual flows between the Overpeck Trunk and the Overpeck Relief Sewer.
- e. The BCUA model **does** mimic the total flows within the Overpeck Trunk and the Overpeck Relief Sewer.

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BCUA Sewer System Characterization / Modeling

Facts:

Most data points for peak flow and volume, as predicted by the model fall, within the WaPUG guidelines and thus the BCUA model was successfully calibrated and verified.

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Borough of Fort Lee

Sewer System Characterization Study



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[illegible]

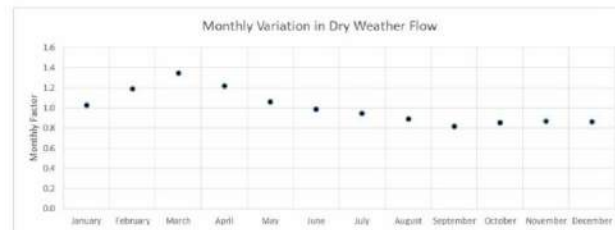
6/25/2018

Population Calculation

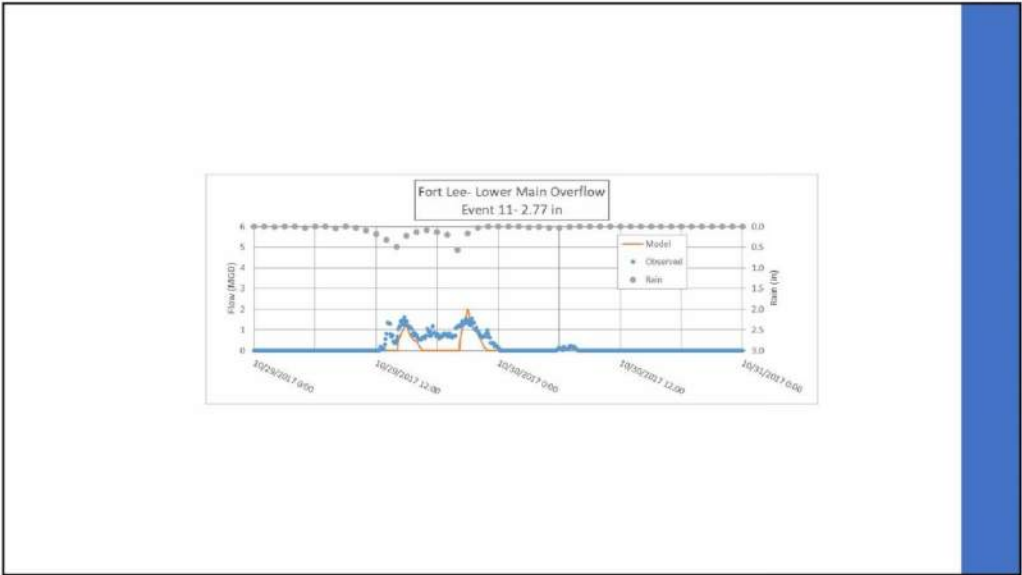
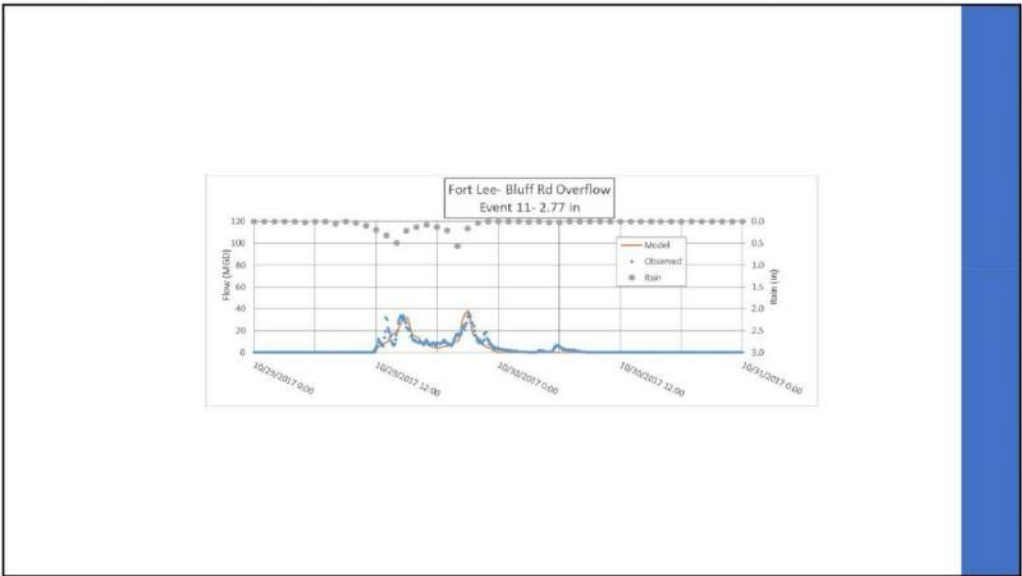
- 2010 census data from the US Census Bureau

Regulator	Population	Average Dry Weather Sanitary Flow (MGD)	Average I/I (MGD)	Average I/I (MGD)
Lower Main	2,532	0.64	0.25	0.39
Palisades	9,101	1.23	0.91	0.32
Bluff Rd	12,094	1.83	1.21	0.62
BCUA-1	3,471	0.52	0.35	0.18
BCUA-2	7,757	2.01	0.78	1.23
Total	34,955	6.23	3.50	2.73

Monthly Variation in Dry Weather Flow



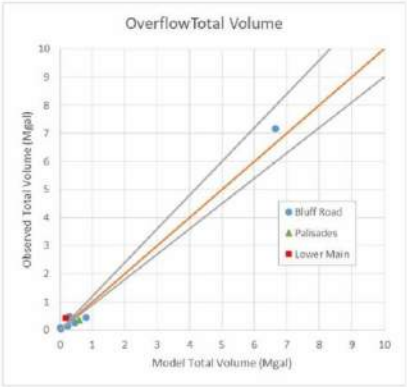
6/25/2018



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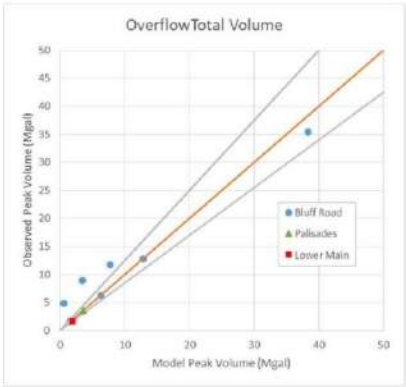


WAPUG Total Volume

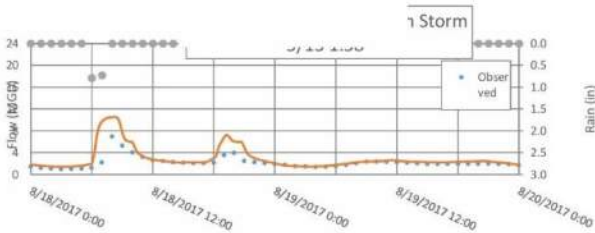


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WAPUG- Peak Flow

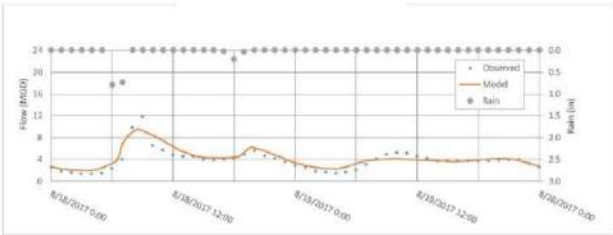


Validation Storm- BCUA-1 (Meters 19) 8/18/17 Storm- 1.52"



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Validation Storm- BCUA-2 (Meters 18 and 24)
8/18/17 Storm- 1.52"



Outfall Summary - 2004

Outfall	001		002	
	Number of Overflows	Overflow Volume (MG)	Number of Overflows	Overflow Volume (MG)
January	3	0.91	0	0.00
February	2	4.58	2	0.11
March	5	1.24	0	0.00
April	5	6.91	4	0.01
May	10	7.14	3	0.24
June	6	3.96	1	0.30
July	7	17.10	5	0.94
August	6	5.93	2	0.14
September	6	19.42	3	2.09
October	1	0.28	0	0.00
November	5	6.03	2	0.35
December	4	3.71	0	0.00
Total	60	77.20	22	4.19

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Outfall Summary - 1988

Outfall	001		002	
	Number of Overflows	Overflow Volume (MG)	Number of Overflows	Overflow Volume (MG)
January	5	4.3	4	0.3
February	5	6.6	4	0.7
March	3	4.1	2	0.4
April	4	3.0	2	0.3
May	7	9.7	6	1.4
June	3	2.5	3	0.1
July	10	15.1	6	2.2
August	4	4.4	1	0.6
September	2	6.6	2	1.0
October	3	7.0	3	0.9
November	6	13.3	6	1.7
December	4	1.2	1	0.0
Total	56	77.7	40	9.59

Contact Information

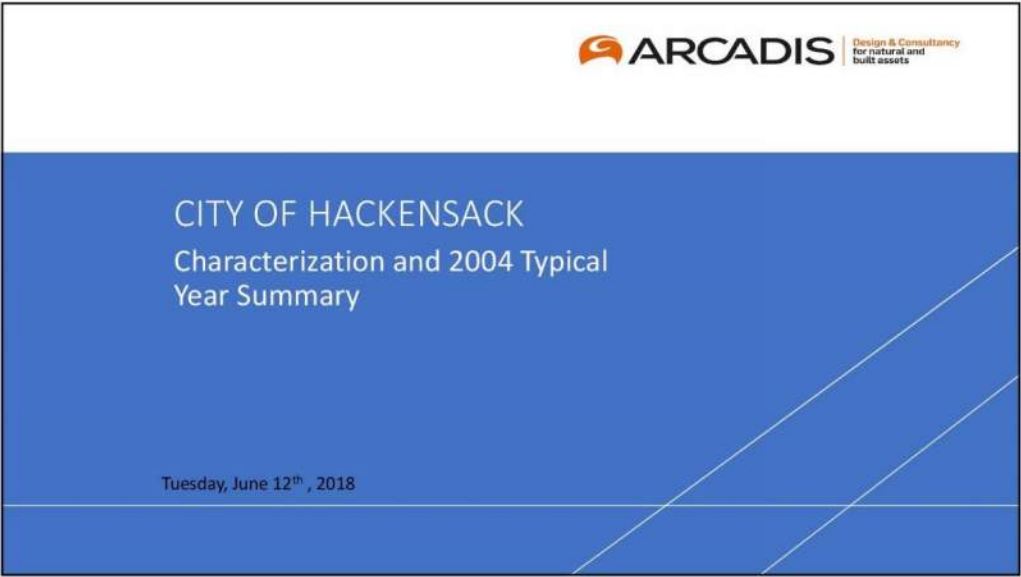
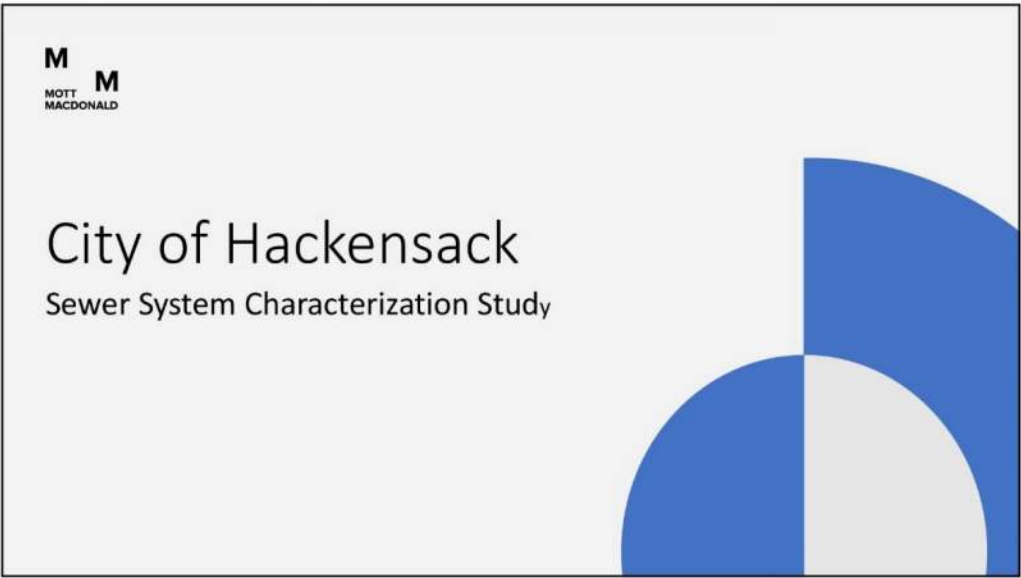
Fort Lee:

- Ed Mignone
 - E-Mignone@fortleenj.org
 - 201-592-3500 x1054

HDR:

- Gary Grey
 - Gary.Gray@hdrinc.com
 - 201-335-9368
- David Stahl
 - David.Stahl@hdrinc.com
 - 212-542-6196

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Agenda

- Approved Reuse of 2006 Data for Characterization
- Model Work
 - Conversion Process & Updates from XPSWMM to PCSWMM
 - Model Calibration
 - 2004 Typical Year Model Work

Approved Reuse of 2006 Data

- Reused 2006 Monitoring Data for the following reasons as approved in the 2015 Characterization Work Plan:
 - Little or no change in impervious area and urban land use data from 1995 to 2012
 - 0.13% change in urban general land use
 - Little change in population from 2005 to 2015 that would increase sanitary flow
 - Population of 44,519 in 2015 is up 4% from 42,657 in 2005
 - Dry weather flow decreased from 2006 to 2015 according to BCUA meter data
 - Industrial flows have not changed
 - SIU is Hackensack University Medical Center which was present in 2006 and 2015

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Approved Reuse of 2006 Data

TABLE 2-3: A Comparison of the City of Hackensack's Impervious Area and Urban Land Use Area from 1995 to 2012

Name Land use or Subdrainage Area	1995 Impervious Area - Acres	2012 Impervious Area, Acres	Percent of Change Impervious Area from 1995 to 2012	1995 Land Use Area, Acres	2012 Land Use Area, Acres	Percent of Change in Urban Land Use Area from 1995 to 2012
URBAN GENERAL LAND USE for Court and Anderson	643.6	646.3	0.42%	1039.3	1040.6	0.13%
Anderson	246.2	248.3	0.85%	465.7	467.3	-0.3%
Court	397.4	398.1	0.15%	573.6	573.3	0.5%
Forests & Barren land	0.8	0.3	-62.5%	10.2	8.8	-13.73%
Total Areas	644.4	646.7	0.34%	1049.5	1049.5	0%

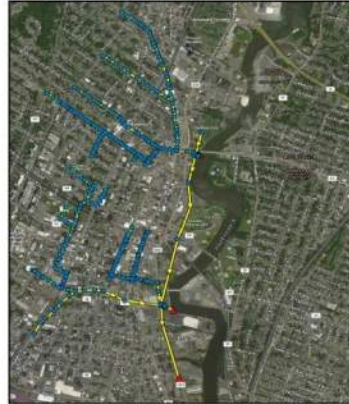
Model Work – Conversion & Updates

- Converted the existing XP-SWMM Hackensack model to new PCSWMM software – completed in 2016
- 2015 condition assessment and survey updates
 - Converted elevation datums from NGVD 29 to NAVD 88
 - Updated manhole/pipe depths based on 2015 Condition Assessment of the CSS
 - Updated elevations and pipe lengths based on 2016 Survey of the CSS

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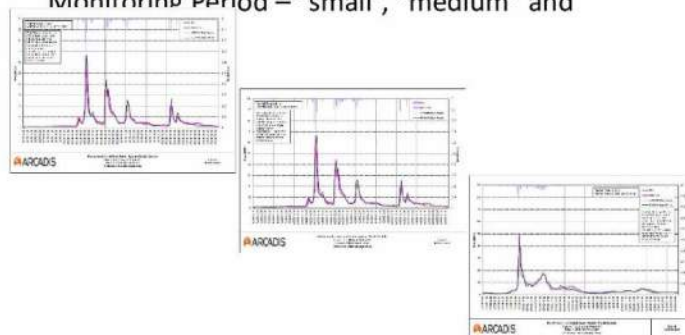
Model Work – Conversion & Updates

- Court and Anderson Street Drainage Areas
- Subcatchment Areas (57)
- Hydraulic Components:
 - Pipes (285)
 - Manholes (285)
 - CSO Regulators
 - Court Street
 - Anderson Street
 - Outfalls (2)
 - 001A
 - 002A



Model Work – Calibration

- 3 Calibration events from the 2006 Data
- Monitoring Period – “small”, “medium” and



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2004 Typical Year Simulation

- QA/QC of 2004 precipitation data from Newark
- Ran the model with this data
- QA/QC of model results
- Analyzed and formatted results with pollutant loadings from 2006 sampling data

2004 Typical Year Simulation

- Anderson Drainage Area Results

Month	Total (All CSO Events)				Pollutant Loadings					
	Days of Overflow	Volume (MG)	% of Annual Volume	Fecal	Enteric	CBOD	TKN	TP	TN	TSS
January	4	1.65	1.6%	1.21E+14	7.32E+13	1,050.6	745.4	27.4	756.6	1,182.3
February	2	6.03	5.7%	4.43E+14	2.68E+14	3,848.6	2,730.7	100.2	2,771.6	4,331.1
March	5	1.42	1.3%	1.04E+14	6.30E+13	903.6	641.1	23.5	650.7	1,016.9
April	7	9.21	8.7%	6.76E+14	4.09E+14	5,873.3	4,167.2	153.0	4,228.6	6,609.5
May	11	9.07	8.6%	6.67E+14	4.04E+14	5,788.8	4,107.3	150.8	4,168.8	6,514.5
June	6	6.93	6.6%	5.09E+14	3.08E+14	4,420.7	3,136.6	115.1	3,183.6	4,974.9
July	9	23.27	22.1%	1.71E+15	1.03E+15	14,846.0	10,533.8	386.7	10,691.4	16,707.1
August	8	8.60	8.2%	6.32E+14	3.83E+14	5,489.1	3,894.7	143.0	3,953.0	6,177.2
September	7	23.48	22.3%	1.72E+15	1.04E+15	14,976.3	10,626.1	390.1	10,785.2	16,853.7
October	3	0.79	0.7%	5.79E+13	3.51E+13	503.0	356.9	13.1	362.3	566.1
November	8	9.31	8.8%	6.84E+14	4.14E+14	5,938.7	4,213.6	154.7	4,276.7	6,683.1
December	6	5.69	5.4%	4.18E+14	2.53E+14	3,628.1	2,574.3	94.5	2,612.8	4,082.9
Annual	76	105.45	1	7.75E+15	4.69E+15	67,286.8	47,727.6	1,752.0	48,442.4	75,699.3

Note: For pollutant loadings, Fecal and Enteric are in MPN units, while all remaining numbers are in pounds.

6/25/2018

2004 Typical Year Simulation

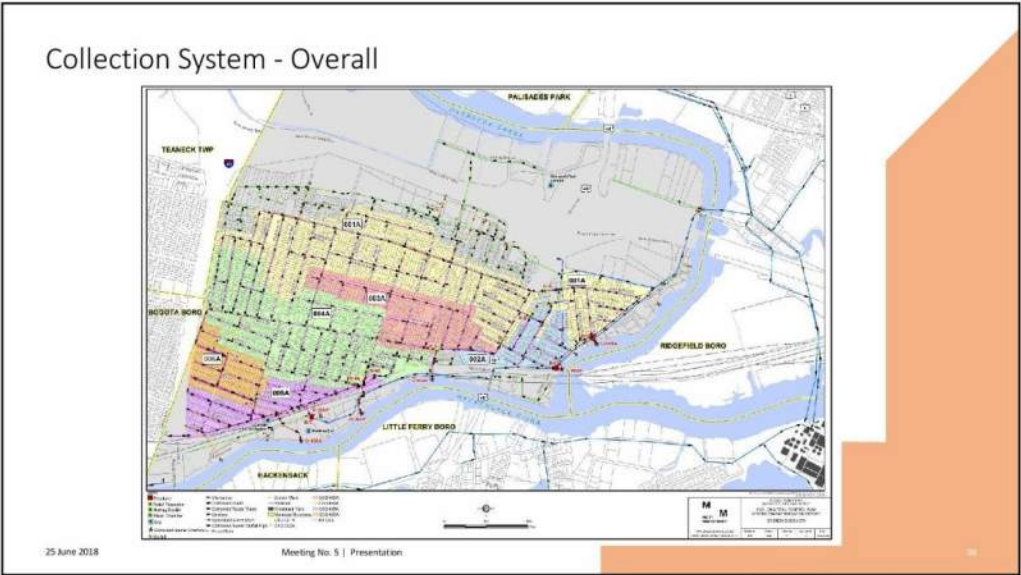
• Court Drainage Area Results

Month	Total (All CSO Events)			Pollutant Loadings						
	Days of Overflow	Volume (MG)	% of Annual Volume	Fecal	Entero	CBOD	TKN	TP	TN	TSS
January	3	1.97	1.3%	1.41E+14	8.31E+13	1,177.2	190.8	32.2	179.1	2,116.9
February	3	10.22	6.7%	7.33E+14	4.30E+14	6,096.6	987.9	167.0	927.5	10,963.1
March	7	1.67	1.1%	1.19E+14	7.01E+13	994.0	161.1	27.2	151.2	1,787.4
April	7	14.57	9.6%	1.04E+15	6.13E+14	8,681.5	1,408.4	238.1	1,322.3	15,628.2
May	10	11.11	7.3%	7.96E+14	4.68E+14	6,627.6	1,073.9	181.5	1,008.3	11,917.8
June	7	9.24	6.1%	6.62E+14	3.89E+14	5,509.9	882.8	150.9	838.2	9,907.9
July	10	34.84	23.0%	2.50E+15	1.47E+15	20,785.0	3,368.0	569.3	3,162.1	37,375.9
August	7	11.57	7.6%	8.29E+14	4.87E+14	6,902.7	1,118.5	189.1	1,050.1	12,412.5
September	6	32.28	21.3%	2.31E+15	1.36E+15	19,258.3	3,120.6	527.5	2,929.8	34,630.6
October	3	0.96	0.6%	6.91E+13	4.06E+13	575.0	93.2	15.7	87.5	1,033.9
November	7	13.72	9.1%	9.84E+14	5.78E+14	8,185.3	1,326.3	224.2	1,245.2	14,718.8
December	6	9.31	6.1%	6.67E+14	3.92E+14	5,554.1	900.0	152.1	845.0	9,987.5
Annual	76	151.47	100.0%	1.09E+16	6.38E+15	60,357.1	14,641.5	2,475.1	13,746.2	162,481.5

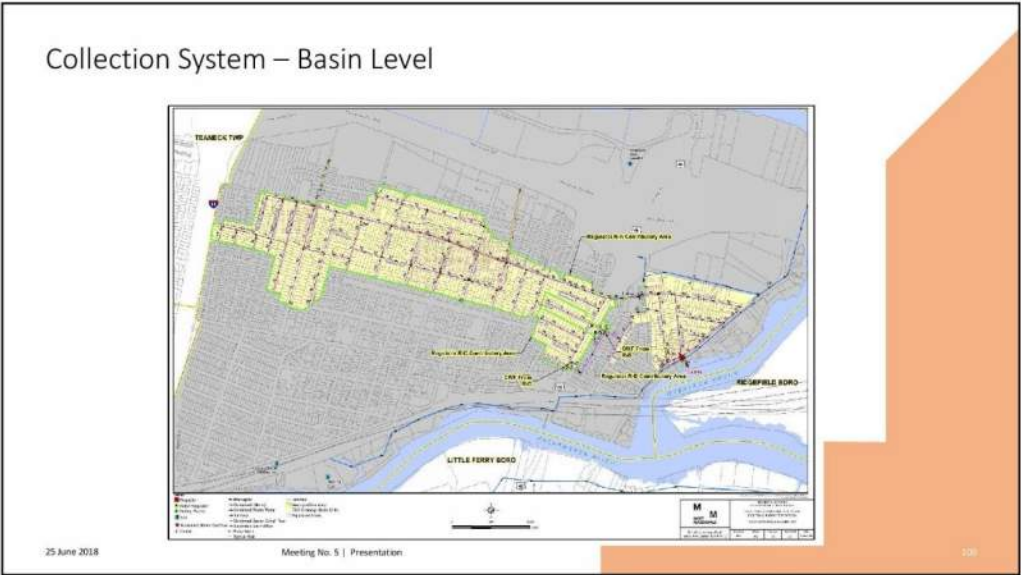
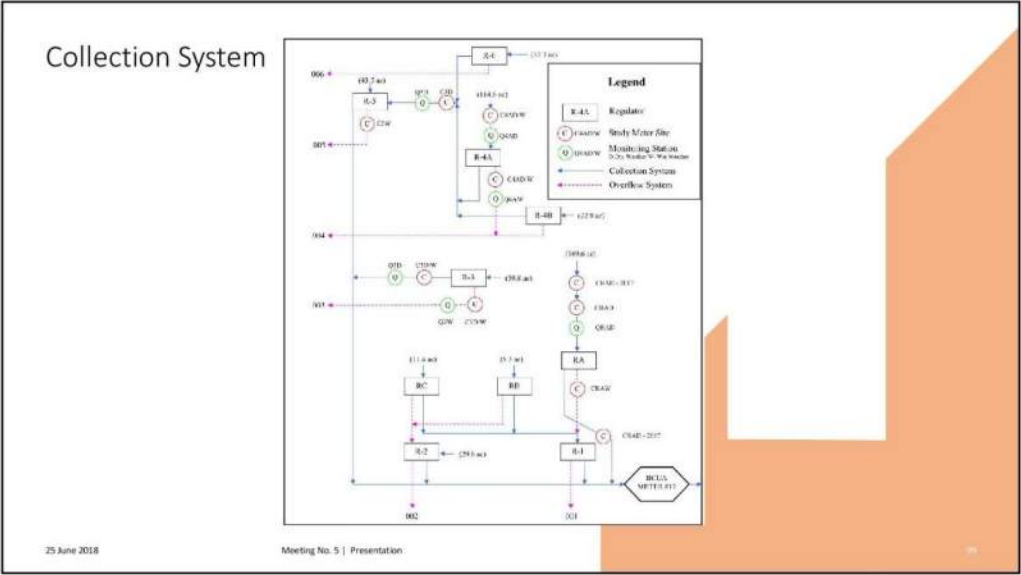
Note: For pollutant loadings, Fecal and Entero are in MPN units, while all remaining numbers are in pounds.

Thank you

6/25/2018



6/25/2018



6/25/2018

Collection System – Basin Level

Pipe Statistics Regulator Basin 001		
Pipe Size	LF of Pipe	% of Total LF
8"	1,709	4%
10"	14,295	35%
12"	9,793	24%
15"	4,540	11%
18"	2,784	7%
20"	972	2%
22"	26	0.1%
24"	2,230	6%
29"	155	0.4%
36"	1,241	3%
48"	3,719	9%
Unknown	657	2%
Total	40,412	100%

25 June 2018

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Collection System – Facilities
Outfalls

Outfall	Latitude*	Longitude*	Receiving Water
001	40° 50' 43"	74° 1' 31"	Overpeck Creek
002	40° 50' 49"	74° 1' 38"	Overpeck Creek
003	40° 51' 13"	74° 1' 40"	Hackensack River
004	40° 51' 27"	74° 1' 49"	Hackensack River
005	40° 51' 35"	74° 1' 49"	Hackensack River
006	40° 51' 38"	74° 1' 56"	Hackensack River

25 June 2018

Meeting No. 5 | Presentation

WARNING

POSSIBLE SEWAGE OVERFLOWS
DURING AND FOLLOWING WET WEATHER
CONTACT WITH WATER MAY ALSO CAUSE
ILLNESS



AVISO

POSIBLES DESBORDAMIENTOS DE AGUAS NEGRAS
DURANTE Y DESPUÉS DE EVENTOS DE LLUVIA
EL CONTACTO CON ESTA AGUA PUEDE CAUSAR
ENFERMEDADES

- REPORT DRY WEATHER DISCHARGE TO NJDEP HOTLINE AT:
1 (877) 927-4337 (NARNODEP)

- REPORT FOUL ODOORS OR UNUSUAL DISCOLORATION TO
NJDEP HOTLINE OR PERMITTEE AT: (565) 555-5555

- NJDEP PERMIT NUMBER: NJ0000000000

- DISCHARGE SERIAL NO. 001A

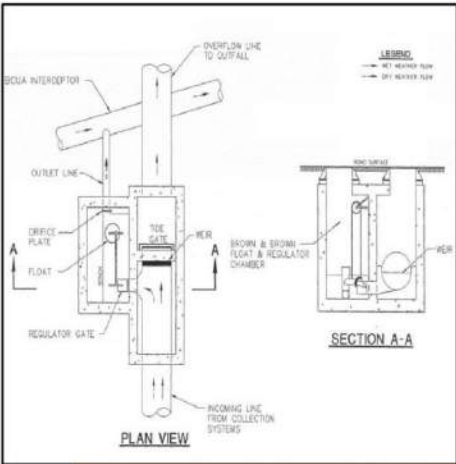
WWW.STATE.NJ.US/DEP/OWQ/CSO.HTM

6/25/2018

Collection System – Facilities

Regulators:

Regulator	Type	Function	Owner
R-A	Float	Internal Relief	Ridgefield Park
R-B	Float	Internal Relief	Ridgefield Park
R-C	Float	Internal Relief	Ridgefield Park
R-1	Float	CSO Regulation	BCUA
R-2	Float	CSO Regulation	BCUA
R-3	Vortex Valve	CSO Regulation	Ridgefield Park
R-4A	Vortex Valve	CSO Regulation	Ridgefield Park
R-4B	Vortex Valve	CSO Regulation	Ridgefield Park
R-5*	Float	CSO Regulation	BCUA
R-6	Vortex Valve	CSO Regulation	Ridgefield Park



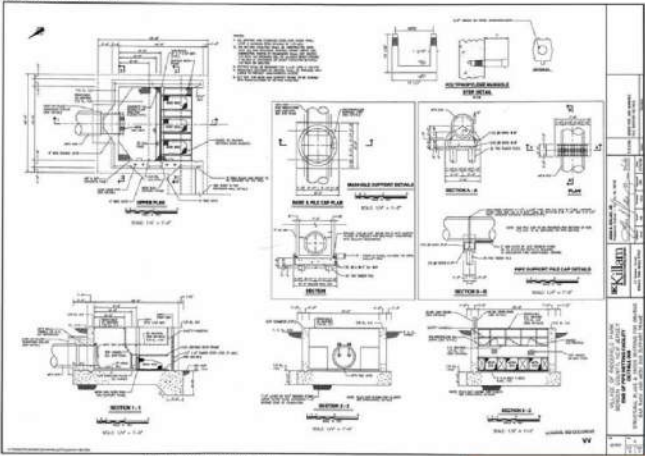
25 June 2018

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Collection System – Facilities

Solids and Floatables Controls

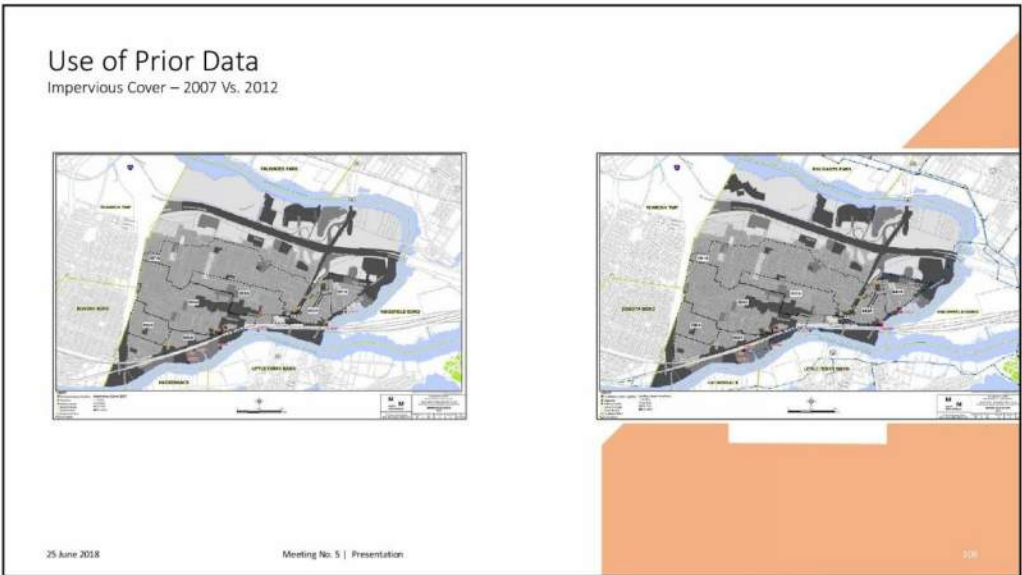
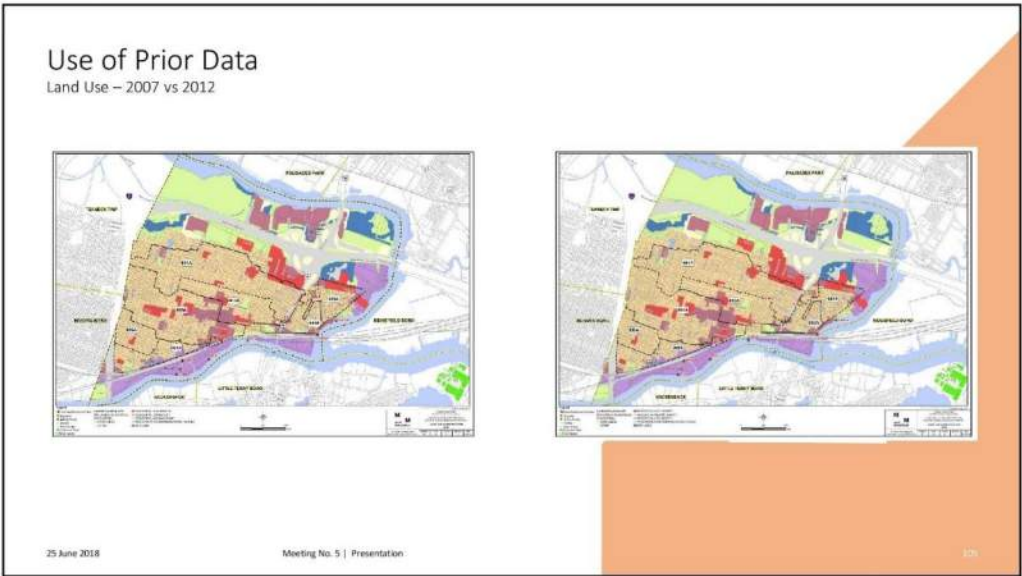


25 June 2018

Meeting No. 5 | Presentation

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6/25/2018



6/25/2018

Use of Prior Data

- Land Use – No Change
- Impervious Cover – No Change
- Population – No Change
- Sewer System – No Change

2007 Characterization is Valid!

2000 Census
12,873

Ridgefield Park village, New Jersey

Population
Census 2010 Total Population

12,729

Source: 2010 Demographic Profile

Ridgefield Park village, New Jersey

Population
2016 ACS 5-Year Population Estimate

12,976

Source: 2016 ACS 5-Year Population Estimate

25 June 2018


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Sewer System Characterization Report

Info Works Computer Model Update

- Additional Sewer Control Facilities



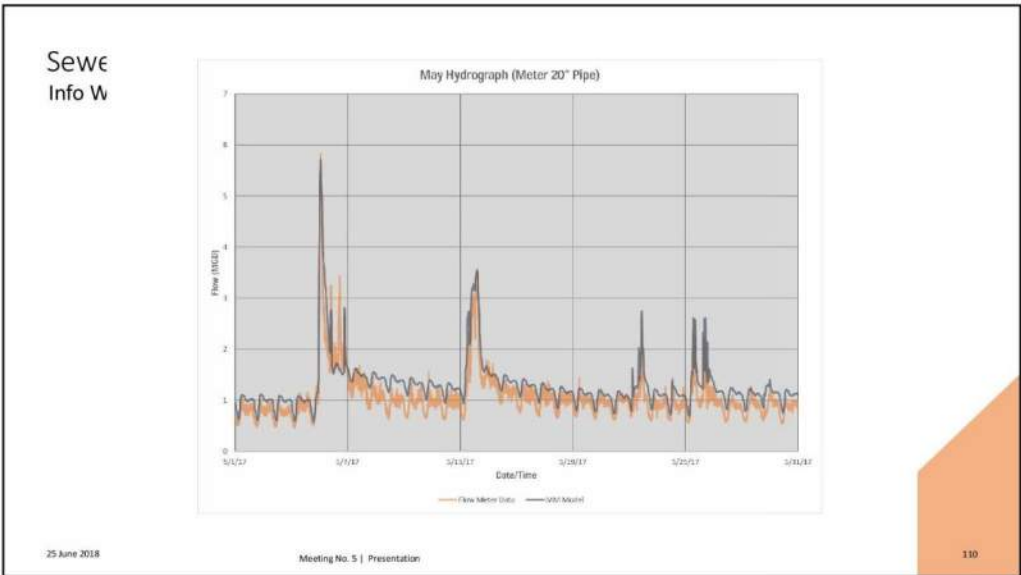
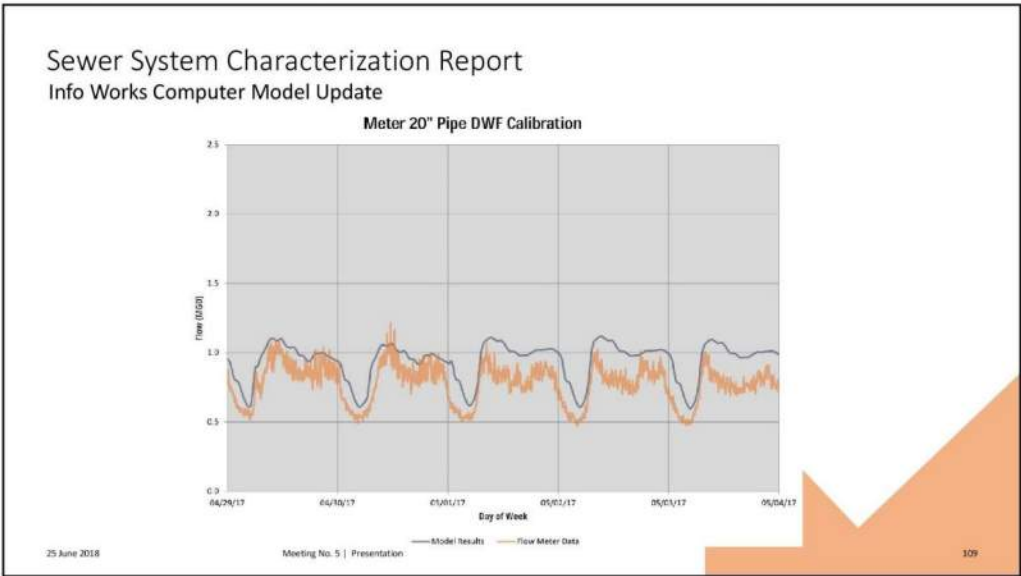


25 June 2018

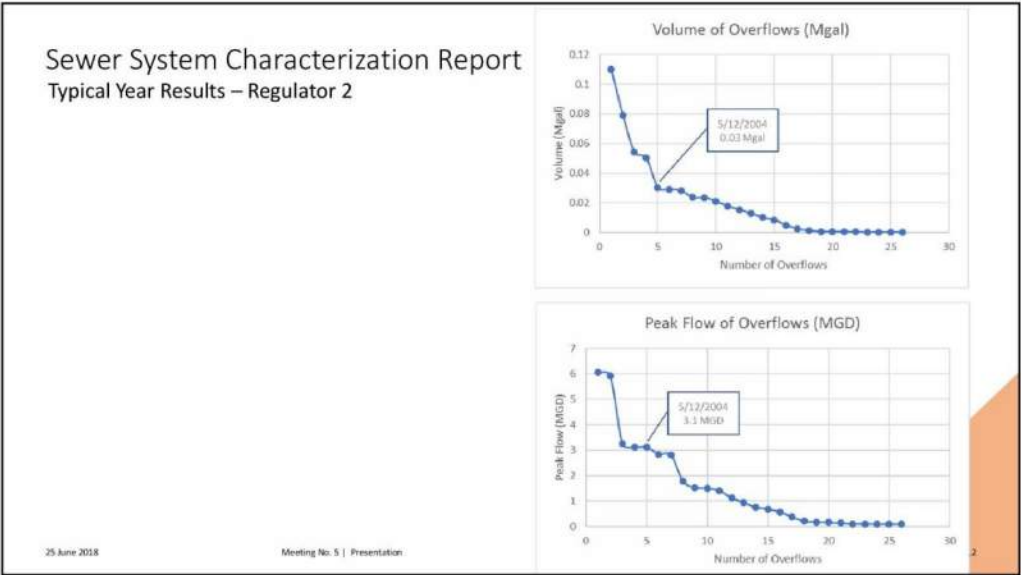
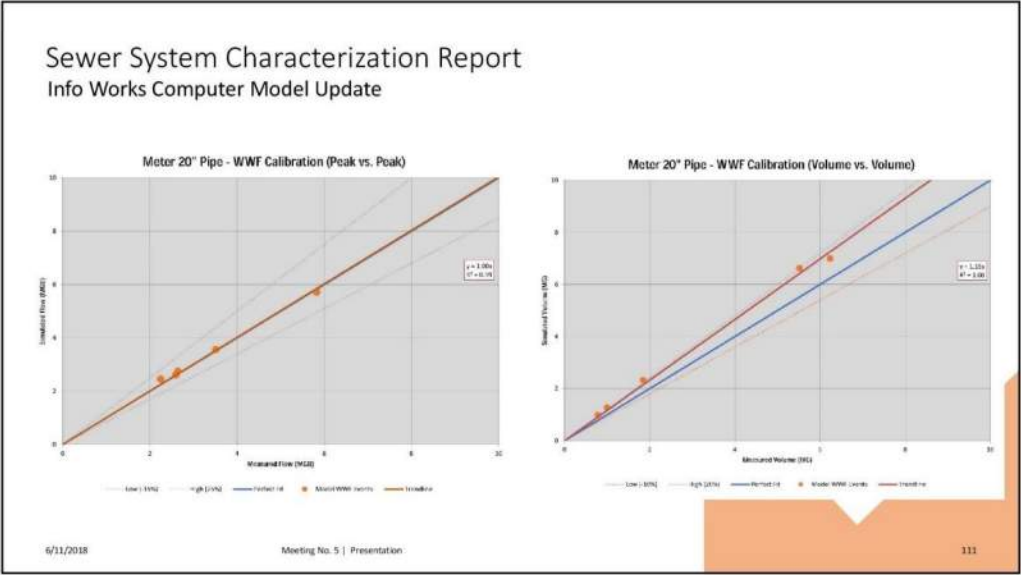
Meeting No. 5 | Presentation

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6/25/2018



6/25/2018



6/25/2018

BCUA CSO Group Project Status Report

Reports with Deadline of July 1, 2018:

- Submit Sewer System Characterization Study Report
(Draft under Review)
- Submit Public Participation Report
CSO Supplemental Team Report
(Draft under Review)
- Submit Compliance Monitoring Program Report* *New Jersey CSO Group Joint Effort
(Draft under Review)
- Submit Consideration of Sensitive Areas Plan
(To be included in Sewer System Characterization Report)

06/12/2018

Meeting No. 5 | Presentation

Questions?

06/12/2018

Meeting No. 5 | Presentation

114

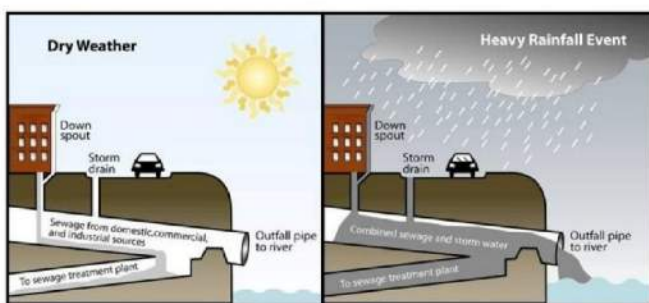
Appendix F. Newsletter, Summer 2018 Issue

Bergen County Utilities Authority

Community: 2

The Future of our Waterways is in Your Hands

Did you know that the communities of Fort Lee, Hackensack and Ridgefield Park have drainage areas with Combined Sewer Systems (CSS) that discharge into local waters during heavy rainfall? Did you know that you can help reduce these discharges?



Combined Sewer Systems are typically located in older urban areas and were constructed to provide for the transportation of sanitary sewage, industrial discharges and stormwater within the same pipe. The combined sewer systems in these municipalities were designed to transport all sewage flows and some wet weather flows for treatment at the Bergen County Utilities Authority Water Pollution Control Facilities in Little Ferry. The system was also designed to discharge excess flows from the Combined Sewer System owned and operated by these municipalities as a Combined Sewer Overflow (CSO) discharge into the adjacent waterways. The transport and treatment systems owned and operated by the BCUA have limited capacity and if CSSs were not permitted to overflow, the community would flood with a combination of stormwater and sewage.

What can you do to help? SLOW the FLOW

As a community and as an individual you can help reduce the amount of water that enters the Combined Sewer System during wet weather events but this will take a shift in thinking. In the past, stormwater was treated as a nuisance to be diverted away as quickly as possible. The result was flows in the combined sewer system that frequently exceeded the treatment plant's capacity and overflowed to our rivers.

By taking a few simple and inexpensive steps, such as using rain barrels and planting rain gardens, you can hold some of the rainwater on your property during the storm. The water you retain can be used on your property for watering plants or released to the sewer system gradually during dry weather. Bergen County Utilities Authority (www.bcua.org) offers a Rain Barrel Incentive Program as well as other tips for reducing the impact of rain water on the combined sewer system.

Water Quality News

Spring 2018

The Clean Water Act Establishes Water Quality Requirements

More than 40 years ago, the Clean Water Act established the goal of making all rivers fishable and swimmable. The Act established water quality criteria for receiving waters as well as a permit system regulating the discharges to the receiving waters. The primary goal of the Clean Water Act was directed at upgrading wastewater treatment plant. As existing treatment plants were upgraded and new treatment plants built, the quality of the receiving waters began improving. Nevertheless, the waterways were still not meeting water quality standards.

In 1995, as part of the EPA CSO Control Policy, all CSO discharges were also brought into the discharge permit system under the General New Jersey Pollutant Discharge Elimination System (NJPDDES) Permit for Combined Sewer Systems. The purpose of the permit was to reduce the pollutant loadings of CSOs on the receiving waters.

The CSO communities in the BCUA service area have been evaluating options to meet the requirements of the current permit. Members of the community have been providing feedback and input into the planning process. More information will be provided as the plans are finalized.

Group is Studying Alternatives

BCUA and member communities with CSSs have joined together in the BCUA CSO Group to develop and coordinate a Regional CSO Long-term Control Plan (LTCP). The LTCP will evaluate the means, costs and effectiveness of control alternatives for reducing the frequency and volume of CSO discharges and will establish a plan, cost, and construction schedule for implementation of the plan. It is anticipated that due to the high cost of construction, the LTCP may take up to twenty-five to thirty years to fully implement.

The BCUA CSO Group is currently undertaking the various studies and investigations needed to develop the LTCP, which is due to the New Jersey Department of Environmental Protection (NJDEP) on or before June 1, 2020. At the present time the individual members of the group are undertaking a Sewer System Characterization Study that includes updating the existing computer models for their system and holding meetings with their CSO Supplemental Teams to educate and obtain public input on the work being undertaken. The Sewer System Characterization Study Report is due to the NJDEP on or before July 1, 2018.

For More Information See these Important Links

- The city of Hackensack
<http://www.hackensack.org>
- The village of Ridgefield Park
<https://www.ridgefieldpark.org>
- The borough of Fort Lee (should go to the CSO portion of their site) <http://www.fortleenj.org>
- New Jersey Department of Environmental Protection
Division of Water Quality Combined Sewer
Overflows <http://www.state.nj.us/dep/dwq/cso.htm> 2

Appendix G. Website Copy



BERGEN COUNTY
UTILITIES AUTHORITY

Home About BCUA Water Pollution Control Recycling & Solid Waste Business Opportunity Employment Contact Us

SEARCH OUR SITE

Search

Full Site This Section

[Search Tips](#)

In Water Pollution Control:

- [About WPC](#)
- [Operational Information](#)
- [Wastewater Treatment Process](#)
- [Sewage Sludge Residual Process](#)
- [Wastewater Reuse Program](#)
- [User Charge](#)
- [Cogeneration System](#)
- [Industrial Pretreatment](#)
- [Wastewater Education](#)
- [RDI/I & SSO Programs](#)

CSO Long-Term Control Plan

Bergen County Utilities Authority (BCUA) Combined Sewer System Communities: The Future of Our Waterways is in Your Hands

Did you know that the communities of Fort Lee, Hackensack and Ridgefield Park have drainage areas with Combined Sewer Systems (CSS) that discharge into local waters during heavy rainfall? Did you know that you can help reduce these discharges?

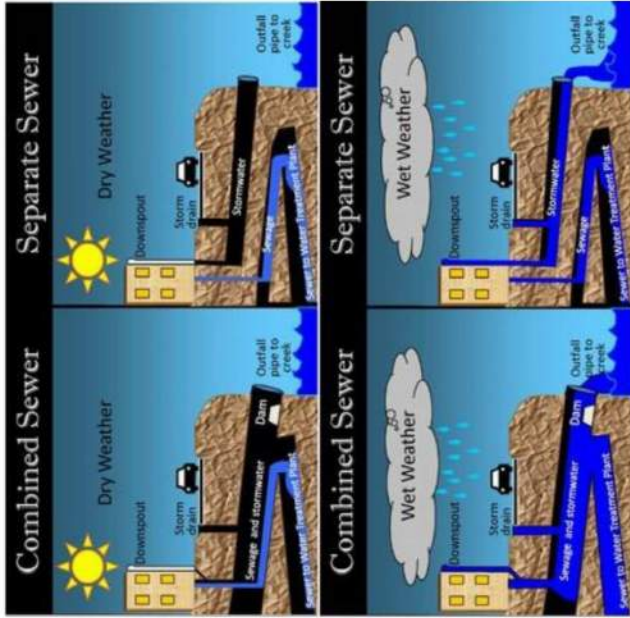
Combined Sewer Systems are typically located in older urban areas and were constructed to provide for the transportation of sanitary sewage, industrial discharges and stormwater within the same pipe. The combined sewer systems in these municipalities were designed to transport all sewage flows and some wet weather flows for treatment at the Bergen County Utilities Authority Water Pollution Control Facilities in Little Ferry. The system was also designed to discharge excess flows from the Combined Sewer System owned and operated by these municipalities as a Combined Sewer Overflow (CSO) discharge into the adjacent waterways. The transport and treatment systems owned and operated by the BCUA have limited capacity and if CSSs were not permitted to overflow, the community would flood.

The History of CSOs

In the latter 1800s Combined Sewer Systems were constructed in urban areas. But as the urban areas grew larger, the water bodies grew more polluted. In the early 1900s, pollution in the waterways in the waterways was so extensive that it caused the end of recreational uses, such as fishing, swimming and boating.

https://www.bcua.org/index.asp?SEC=AEBEC7FF-B96F-485D-B704-7E9E888905A0&Type=B_BASIC

- CSO Long-Term Control Plan
- Treatment Works Approval & Sewer Connections
- Call Before You Dig
- WPC FAQ's
- WPC Links
- WPC Forms & Applications



In response, interceptor sewers were built to convey the sanitary and industrial flows to newly built wastewater treatment plants located downstream of the cities. The interceptor sewers and treatment plants were sized to treat all of the dry weather flows and a portion of the wet weather flows.

Regulators were installed on the outfalls. These regulators were designed to divert all the dry weather flows to the interceptor sewer. During a rainfall event the regulators would divert the combined dry weather sanitary and wet weather storm flows to the interceptor up to its capacity. If flows exceeded the capacity of the interceptor sewer, the regulator would then divert the excess flow to the river. These discharges are called combined sewer overflows (CSOs).

What has been done to solve the problem?

The Federal Water Pollution Control Act Amendments of 1972 and 1977, known as the Clean Water Act, established the goal of making all rivers fishable and swimmable. The Act established water quality criteria for receiving waters as well as a National

Pollutant Discharge Elimination System

The primary goal of the Clean Water Act was directed at upgrading wastewater treatment plants. As existing treatment plants were upgraded and the new treatment plants built, the quality of the receiving waters began improving.

While the quality of the receiving waters was improving, they still were not meeting water quality standards. In 1995, all CSO discharges were also brought into the discharge permit system under the General New Jersey Pollutant Discharge Elimination System (NJPDES) Permit for Combined Sewer Systems. The purpose of this permit was to develop computer models to better understand how these systems work and use this to evaluate various means and methods that could be used to reduce the pollutant loadings of CSOs on the receiving waters.

In 2015, the New Jersey Department of Environmental Protection (NJDEP) issued final Individual NJPDES Permits to municipalities with CSS and authorities that transport and treat wastewater to undertake a Regional Combined Sewer Overflow (CSO) Long-Term Control Plan (LTCP). The members of the BCUA CSO Group are not the only municipalities with combined sewer systems and CSO discharges. Additional information on other municipalities and authorities with individual NJPDES permits can be obtained at the NJDEP website as noted below.

BCUA and member communities with CSSs have joined together in the BCUA CSO Group to coordinate and final a Regional CSO LTCP. The LTCP will evaluate the means, costs and effectiveness of control alternatives for reducing the frequency and volume of CSO discharges and will establish a plan, cost, and construction schedule

for implementation of the plan. It is anticipated that due to the high cost of construction, the LTCP may take up to twenty-five to thirty years to fully implement.

What can you do to help now? SLOW the FLOW

As a community and as an individual you can help reduce the amount of water that enters the Combined Sewer System during wet weather events but this will take a shift in thinking. In the past, homeowners treated stormwater as something that should be diverted off their property as quickly as possible. The result would be flows in the combined sewer system that would exceed the treatment plant's capacity.

By taking a few simple and inexpensive steps, you can hold some of the rainwater on your property during the storm. The water you retain can be used on your property for watering plants or released to the sewer system gradually during dry weather.

Bergen County Utilities Authority offers a Rain Barrel Incentive Program as well as other tips for reducing the impact of rain water on the combined sewer system.

- Rain-derived Infiltration and Inflow Reduction Program (BCUA)
http://www.bcuva.org/index.asp?SEC=37286623-B069-4C00-8F98-A37A7D3EBCD1&Type=B_BASIC
- Homeowner's Guide (BCUA) and Rain Barrel Incentive Program
http://www.bcuva.org/vertical/sites/%7BF76805AC-71CD-427F-AD9B-9E08876F224A%7D/uploads/II_brochure.pdf

In addition, the Department of Environmental Protection offers information about Green Infrastructure that you can install when making modifications to your property.

- Environmental Protection Agency
Green Infrastructure
<https://www.epa.gov/green-infrastructure>

BCUA is Studying Alternatives

The BCUA CSO Group is currently undertaking the various studies and investigations needed to develop the LTCP, which is due to the New Jersey Department of Environmental Protection (NJDEP) on or before June 1, 2020. At the present time the individual members of the group are undertaking a Sewer System Characterization Study that includes updating the existing computer models for their system and holding meetings with their CSO Supplemental Teams to educate and obtain public input on the work being undertaken. The Sewer System Characterization Study Report is due to the NJDEP on or before July 1, 2018.

Additional information will be provided on this link as it is developed.

For More Information See these Important Links

- CSO Notification System
<http://njcsco.hdrgateway.com>
- The city of Hackensack (should go to the CSO portion of their site)
<http://www.hackensack.org>

https://www.bcuva.org/index.asp?SEC=AEBEC7FF-B96F-485D-B704-7E9E888905A0&Type=B_BASIC

- The village of Ridgely Park (should go to the CSO portion of their site)
<https://www.ridgelypark.org>

- The borough of Fort Lee (should go to the CSO portion of their site)
<http://www.fortlee.org>

- New Jersey Department of Environmental Protection Division of Water Quality
Combined Sewer Overflows
<http://www.state.nj.us/dep/dwg/cso.htm>

- Environmental Protection Agency
National Enforcement Initiative: Keeping Raw Sewage and Contaminated Stormwater Out of Our Nation's
Waters
<https://www.epa.gov/enforcement/national-enforcement-initiative-keeping-raw-sewage-and-contaminated-stormwater-out-of-our>

- New Jersey Future CSO Fact sheet
<http://www.njfuture.org/wp-content/uploads/2015/03/New-Jersey-Combined-Sewer-System-Fact-Sheet.pdf>

- Clean Water New Jersey
<http://www.cleanwater.nj.org>

Foot of Mehrhof Road, Little Ferry, NJ 07643 / Phone: 201.641.2552 / Fax: 201.641.6407

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Printer-friendly Version

Appendix H. A Homeowner's Guide Brochure

Need more information



For more information about rain-derived infiltration and inflow and how simple plumbing improvements will protect your property from sanitary sewer overflows, please visit us on the web at

www.bcuu.org

or if you still have questions, call the
BCUA RDI&I HOTLINE
at
1-201-807-5825.

BERGEN COUNTY UTILITIES AUTHORITY WATER POLLUTION CONTROL

SERVICE AREA

Bergenfield Harrington Park Park Ridge
Bogota Hasbrouck Heights Ridgely
Carlstadt Haworth Ridgely
Cliffside Park Hillside River Edge
Closter Leonia River Vale
Cresskill Little Ferry Rochelle Park
Demarest Maywood Rutherford
Dumont Montvale South Hackensack
East Rutherford Moonachie Teaneck
Edgewater New Milford Tenafly
Emerson Northvale Teterboro
Englewood Norwood Washington
Englewood Cliffs Old Tappan Westwood
Fairview Oradell Woodcliff Lake
Fort Lee Palisades Park Wood-Ridge

TAKE ADVANTAGE OF THE BCUA RAIN BARREL INCENTIVE PROGRAM

TWO SIZES TO FIT YOUR NEEDS



Why rain barrels?

SAVE MONEY ON YOUR WATER BILL

Rain barrels collect and store water from your roof for later use to water your lawn, garden, or indoor plants, wash your car or pet, and for other everyday outdoor water uses.

KEEP SEWAGE OUT OF YOUR BASEMENT

Rain barrels reduce stormwater inflow into our sanitary sewer system and keep wastewater out of our homes.

SAVE TAXES & HELP KEEP UTILITY COSTS LOW

Reduce stress on the public sewage collection and treatment systems, eliminating the need to add to or enlarge these systems.

CREATE A HEALTHIER ENVIRONMENT

Rain barrels are the first step to healthy streams, lakes, and rivers; and rainwater is better for your plants because it lacks chlorine and fluoride.



basement sewage backups
street sewer overflows
untreated sewage in our rivers
rising water and sewer rates



A HOMEOWNER'S GUIDE

HOW YOU CAN HELP PROTECT OUR
NEIGHBORHOODS AND KEEP OUR WATERWAYS
CLEAN.

**RAIN-DERIVED
INFILTRATION AND INFLOW
REDUCTION &
SANITARY SEWER OVERFLOW
ELIMINATION PROGRAM**



BERGEN COUNTY UTILITIES AUTHORITY
LITTLE FERRY, NEW JERSEY

OUR GOAL:

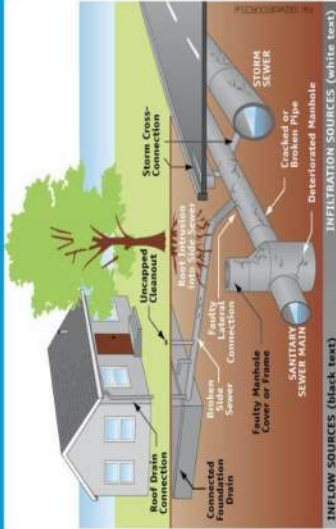
KEEP GROUND WATER AND STORM WATER OUT OF THE MUNICIPAL SANITARY SEWER SYSTEM AND ELIMINATE SANITARY SEWER OVERFLOWS FROM STREET MANHOLES AND INTO BASEMENTS.

Many homes have improper or damaged drainage connections that allow rainwater into the sanitary sewer system instead of directing it to the storm sewer system.

Such connections can include roof drains and downspouts, sump pumps, foundation drains, and area drains in basements, lawns, and driveways. In addition, many homeowners' private lateral sanitary sewer service connections may be damaged, allowing groundwater to leak into the sanitary sewer system.

Rainwater in the municipal sanitary sewer system adds unnecessarily to the cost we all pay for sewage collection and treatment, and in heavy rain can cause untreated sewage to back up in sewer pipes and flood basements. It can also enter waterways and affect the public water supply.

This brochure explains your responsibilities as a homeowner and how the Bergen County Utilities Authority can help you make sure your property is properly drained.



This diagram shows how improper and damaged connections allow rainwater to bypass the storm system and overwhelm the sanitary sewer treatment system.

Homeowners can help reduce excessive water from entering the sanitary sewer system.

► **SUMP PUMPS:** If you have a sump pump in your basement that is connected to the sanitary sewer system, it should be redirected to the storm sewer system, the ground on your property, or to a dry well.

► **ROOF DRAINS:** If your roof drains are connected to the sanitary sewer system, the drains should be redirected on the ground or to a dry well. **One simple and practical solution for the homeowner is to utilize rain barrels to collect roof drain stormwater for use on lawns and gardens. The BCUA is offering two types for sale at a significant discount.**

► **AREA DRAINS:** Area drains located in basements, driveways, or lawns that drain to the sanitary sewer system should be redirected to the storm sewer system or a dry well.

► **FOUNDATION DRAINS:** Foundation drains that are connected to the sanitary sewer system should be redirected to the storm sewer system or a dry well.

► **SERVICE CONNECTIONS:** Broken or damaged private building service connections (PSCs) - also called house laterals - including missing or broken cleanout caps, also contribute to rain-derived groundwater and stormwater entering the sanitary sewer system. These types of defects should be repaired.

WHAT IS AN SSO?

A **SANITARY SEWER OVERFLOW (SSO)** is an overflow of sewage from the municipal sanitary sewer system into basements, property, onto lawns, roads, and into waterways. SSOs occur when too much rain water enters the sanitary sewer system and overwhelms that system's capacity.

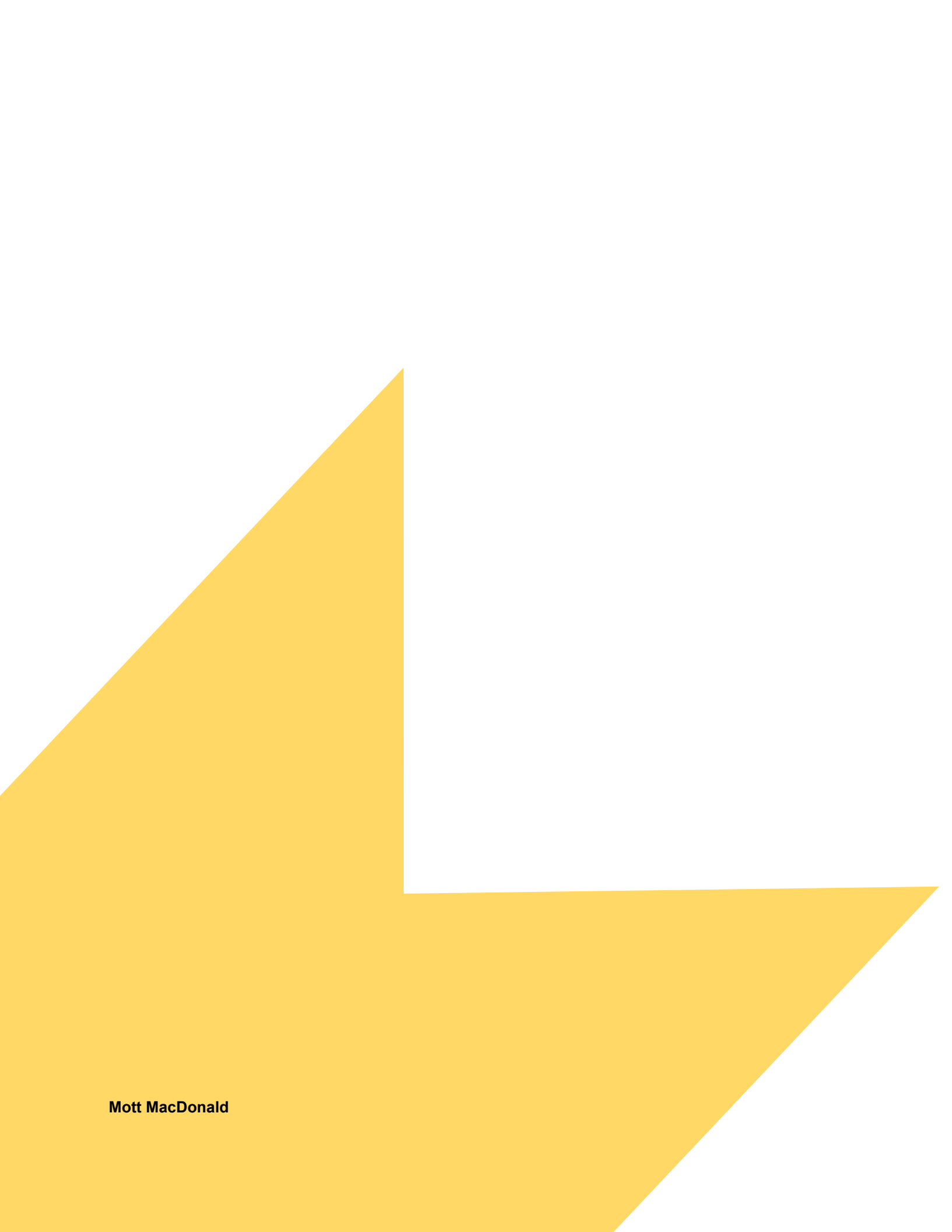
WHAT IS RDI&I?

RDI&I means "Rain-derived infiltration and inflow." **INFILTRATION** is the leakage of ground and storm water into the sanitary sewer system through defects in pipes and manholes during and after rainfall. **INFLOW** is the entrance of stormwater into the sanitary sewer system from improper household connections and other sources.

Appendix I. Signage Templates for Notices at Outfalls







Mott MacDonald